Transit-Supportive Guidelines

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Ministry of Transportation

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What are these guidelines about?

As our cities grow larger, more opportunities for work, education and housing become available. However, these opportunities are often dispersed across communities, so that individuals tend to travel farther for work and school or to spend time with family and friends. As commuting distances increase, efficient, effective *transit* service becomes even more important. Yet transit is not just about getting people from point A to point B. It is increasingly being recognized as an opportunity to limit our impacts on the environment, better adapt to changing demographics, reduce our overall costs of living and build healthier communities. Successfully planned, investment in transit also has the potential to be the launching pad for a wide range of initiatives aimed at strengthening communities and increasing economic competitiveness.

These guidelines are a distillation of transit-friendly land use planning, urban design and operational practices, drawing from experiences in Ontario, elsewhere in North America and abroad. Their aim is to assist urban planners, transit planners, developers and others, working in communities of all sizes, in creating an environment that is supportive of transit and developing services and programs to increase transit ridership.

Understanding that *transit-supportive* planning requires coordination among a broad range of actors, from community planners to transit agencies, these guidelines include considerations related to both planning and transit operations. These guidelines include transit-supportive principles and strategies to promote development patterns that make transit less expensive, less circuitous and more convenient and to enhance the service and operational characteristics of transit systems to make them more attractive to potential transit users.

The strategies, case studies and resources presented in these guidelines are to be used at the discretion of municipalities and other planning authorities as an important reference in their planning and decision-making processes. The guidelines are not a statement of provincial policy but present ways of meeting the objective of building transit-supportive communities in support of provincial policies and directions. Understanding that circumstances will vary from place to place, it is expected that municipalities will adapt these guidelines and examples to their own individual situations and develop solutions and approaches beyond those provided here. In implementing these strategies, municipalities are responsible for ensuring that they comply with any applicable legislation, policy or standards.

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Ontario Ministry of Transportation

Who is this guideline for and how can it be useful?

As a guideline for Ontario communities, this document is intended to provide guidance for a wide range of places, from small towns that may not currently provide transit service, to mid-size cities and large urban centres with extensive existing and planned transit infrastructure.

The guideline places significant emphasis on creating a pattern of development within existing communities and new development that is capable of supporting increased transit ridership in existing systems and helping to facilitate the establishment of new transit systems.

For smaller centres this document will be most useful in providing tools and strategies to create a more compact land use pattern supportive of walking and cycling, optimize the effectiveness of existing or future transit services, retain ridership and better target transit service. In mid-size or larger cities, the guideline will help to better utilize existing *infrastructure*, grow ridership and manage urban growth in a more transit-supportive manner.

This document contains a series of community-wide, district-level and site-specific guidelines, transit improvement strategies and implementation tools. It is meant to be read as a whole, however the many actors involved in the creation and operation of transit and the development of our towns and cities mean that this guideline will likely be used in different ways:

- Municipal planners reviewing a development application or property developers, land-use and urban design professionals working on development applications may focus more on the District-Level and Site-Specific Guidelines;
- A municipality drafting a new official plan or *secondary plan* may focus on the Community-Wide Guidelines;
- A university trying to better integrate transit into their campus may focus on the Specialized Uses Section;
- Transit agencies and transit service providers wishing to improve service or grow transit ridership might focus more on the Transit Improvement Guidelines; and
- *Regions* and municipalities preparing for transit might focus on the System Service and Operations guidelines and Ridership Strategies guidelines within the Transit Improvement Guidelines chapter.

Context

Interest in transit-supportive communities has continued to grow since the publication of the original Transit-Supportive Land Use Planning Guidelines in 1992. Today, new policy frameworks, emerging ideas and lessons from a generation of transit-supportive communities provide a strong impetus for an update.

Ontario is at the forefront of transit-supportive planning and has put a number of policies and programs in place to support the development of compact, complete, transit-friendly communities. The Provincial Policy Statement, 2005 (PPS) contains a number of transit-supportive planning policies that all Ontario communities must be consistent with. These include:

- integrating transportation and land use considerations at all stages of the planning process;
- identifying growth areas, *nodes* and *corridors*;
- an emphasis on *intensification* and the creation of a more compact urban form;
- promoting a land use pattern, density and mix of uses that minimize the length and number of vehicle trips and support transit as a viable mode choice;
- promoting energy efficiency and improved air quality through land use and development patterns which promote the use of public transit and other alternative transportation modes; and
- protecting corridors and *rights-of-way* for transit and transit-related facilities.

These guidelines are intended to assist municipalities in implementing the policies and objectives of the PPS as well as those of the Growth Plan for the Greater Golden Horseshoe and the Growth Plan for Northern Ontario, where applicable. To support the PPS, the Province has also established long-term transit funding programs through the dedicated gas tax program to assist Ontario municipalities in delivering and expanding their transit infrastructure and services to increase transit ridership across the province. Municipalities subject to the Growth Plan for the Greater Golden Horseshoe, 2006 are expected to develop municipal strategies and policies for urban growth centres and other intensification areas consistent with transit-supportive guidelines established by the Province (as required by Growth Plan policy 2.2.3.6 h).

The section on transit improvement strategies provides guidance regarding system operations, fare collection and quality of service. It describes best practice strategies for facilities, operations and systems that can help transit systems run more effectively, improve the experience and convenience of transit for users and ultimately, increase ridership.

Providing transit in towns and cities designed and shaped for the private automobile can be a challenging task. It requires greater effort to provide the kind of convenient, fast and comfortable transit service that can compete with the private automobile and result in people choosing transit as their preferred mode. To achieve this, a significant emphasis must be placed on enhancing the user experience by creating transit systems that are easily accessible, provide quick, direct routes to destinations and are comfortable and enjoyable for all users, including persons who use mobility devices such as walkers and wheelchairs. This requires planning at every level, from regional-scale considerations, such as transit network design, to detailed consideration of the quality of service afforded transit users, such as how a system is operated and fares are collected.

Land use and transit planning integration

In transit-supportive places, transit and land use decisions are integrated at both a system-wide and local scale so that transit becomes more easily accessible, serves major land uses and ridership generators and provides direct and efficient routes between destinations.

There is a strong relationship between transit ridership and land use patterns.

Unlike the automobile, transit, to be efficient, must limit its stops to logical locations within a system. Concentrating densities and a mix of uses in and around stop and station areas is an effective way of optimizing transit infrastructure, placing more people and uses within close proximity to transit facilities and supporting higher levels of *pedestrian* activity. The layout and design of buildings, streets and public spaces can help to integrate transit facilities into their surroundings and create a more comfortable environment for pedestrians, cyclists and transit users.

Supporting transit requires reconsideration of the way cities and towns grow and evolve.

When towns and cities grow outward at lower densities and land uses are not coordinated alongside planned transit investments, distances between locations get longer. This makes provision of transit difficult. Routes become longer and because users are spread out around a larger area, the ridership per kilometre of service decreases. This can make transit systems less cost effective to operate, resulting in service cuts and loss of ridership. By using investments in transit to encourage more focused development and place-making, the effects of outward expansion can be minimized, valuable farm lands or natural areas can be preserved and road congestion moderated.

Creating transit-supportive communities demands that a better balance be achieved between all modes of transportation.

All transit users are pedestrians at some point in their journey, whether on their walk to the station, accessing or transferring between different modes of transit, or walking from the stop or station area to their local destination. Environments that are designed for the car without consideration for other modes of transportation can be unsafe or uncomfortable for pedestrians, cyclists and transit users. The design and function of the mobility network should act to shorten or reduce trips and recognize pedestrian circulation and comfort as its highest priority followed by cycling, public transit and the private vehicle.

Benefits of transit-supportive planning and increased ridership

Transit is an excellent tool to help achieve sustainable development and an improved urban environment. In many cases, the quality of the environment, quality of life, economic competitiveness and vitality of transit-oriented urban areas are all higher than those of automobile-oriented urban areas.

Transit is good for the environment and public health.

Under normal loading conditions, less energy is needed to move a person by transit than by automobile. Since less energy is used to move people, smaller amounts of air pollutants and greenhouse gases are produced by transit per person-kilometre of travel. Transit-supportive land use patterns are also pedestrian- and cyclist-friendly, making it safer and easier for people to use *active transportation* along with transit. A transit-oriented city promotes greater public presence on the sidewalks, a renewal of downtown activities, and greater informal surveillance and safety.

Transit is good for the economy, making our cities and regions more efficient.

Congested highways and gridlocked streets result in significant delays to the trade and delivery of goods and services. The increasing costs to our health care system from smog days and the higher proportion of family budgets allocated to basic transportation are having a significant social and economic impact on our province. By helping to manage congestion and travel times, better transit can improve the efficiency of our economy, facilitating goods movement and improving commuting times. Increasing transportation choices can help to increase the affordability of our towns and cities, reduce household costs and provide a greater range of housing opportunities. Transit investments can also encourage revitalization of neighbourhoods and streets, attracting private investment and employers to an area by improving accessibility and neighbourhood vitality.

Transit infrastructure is cost-effective to provide and use.

Since transit requires less land and energy than the private car to move the same number of people, it is often cheaper to meet mobility needs with transit rather than through other measures such as road widening or new parking facilities. The higher densities and compact development transit requires also save costs by maximizing the efficiency of existing services and reducing the need for additional serviced land. In addition, land not used for transportation can be used in other ways, whether for public open space and other *active uses* or for the protection of environmentally sensitive areas.

Transit-supportive planning is important in both large and small communities

In communities of all sizes environmental, social and economic concerns provide an impetus for creating more transit–supportive communities.

Transit-friendly design is pedestrian-friendly design and good planning.

Some of the most enduring small communities in Ontario are known for their attractive, walkable environments. Since transit users are often pedestrians at both ends of the trip, transit-supportive planning and design improves conditions for pedestrians, creating safer, more attractive streets and encouraging a greater mix of uses, which can reduce travel distances and enhance transit access.

Transit-friendly communities help to preserve natural areas and rural landscapes.

The high quality of life associated with Ontario communities is strongly tied to their surrounding natural and rural environments. The more compact, *mixed-use* nature of transit-supportive community design can help to support sustainable growth while also helping to preserve agricultural lands and environmentally sensitive areas.

Planning for transit early can help reduce costs in the future.

By considering the recommendations contained in these guidelines, communities, including those that don't yet offer transit services, can expand in ways that will support transit ridership and minimize the potential for increased congestion. With rising land and infrastructure costs, these strategies will help to promote a more efficient use of resources as communities grow.

Transit can assist small communities in adjusting to changing demographics.

Large areas of dispersed development can restrict mobility for those that are unable to drive. Implementation of transit services even in small communities, where possible, can assist non-drivers, including youth and the elderly, in accessing local services.

How to use this document

The document is structured into four key chapters

- Chapter 1: Community-Wide Guidelines sets the stage for the creation of transit-supportive communities through a range of higher level planning strategies.
- Chapter 2: *District*-Level and Site-Specific Guidelines contains a series of more detailed design guidelines relating to streets, buildings infrastructure, and unique uses.
- Chapter 3: Transit Improvement Guidelines provides an overview of transit improvement programs, innovations and services that can help to increase transit ridership.
- Chapter 4: Implementation provides an overview of the implementation tools that can be used to achieve the principles and guidelines within the document. The document concludes with a series of best practice case studies, a glossary of terms, an index and a summary of resources and references.

Throughout the document, each topic has been provided a separate layout.

The guidelines are organized into a series of topics, each of which has been consistently structured as per the illustration to the right. The document contains strategies applicable to all community scales. While exceptions may exist, where a strategy is more relevant to communities of a specific scale, this is identified through the use of a symbol.

Small Communities – smaller than 50,000 (e.g. Ingersoll, Kenora, Brockville, Timmins)

Mid-size Communities – 50,000–150,000 (e.g. Belleville, Brantford, Thunder Bay, Barrie)

Large Communities – 150,000–500,000 (e.g. Sudbury, Oshawa, Windsor, London)

Big Cities – greater than 500,000 (e.g. Hamilton, Ottawa, Toronto)

Strategies with a strong environmental focus have been identified with a

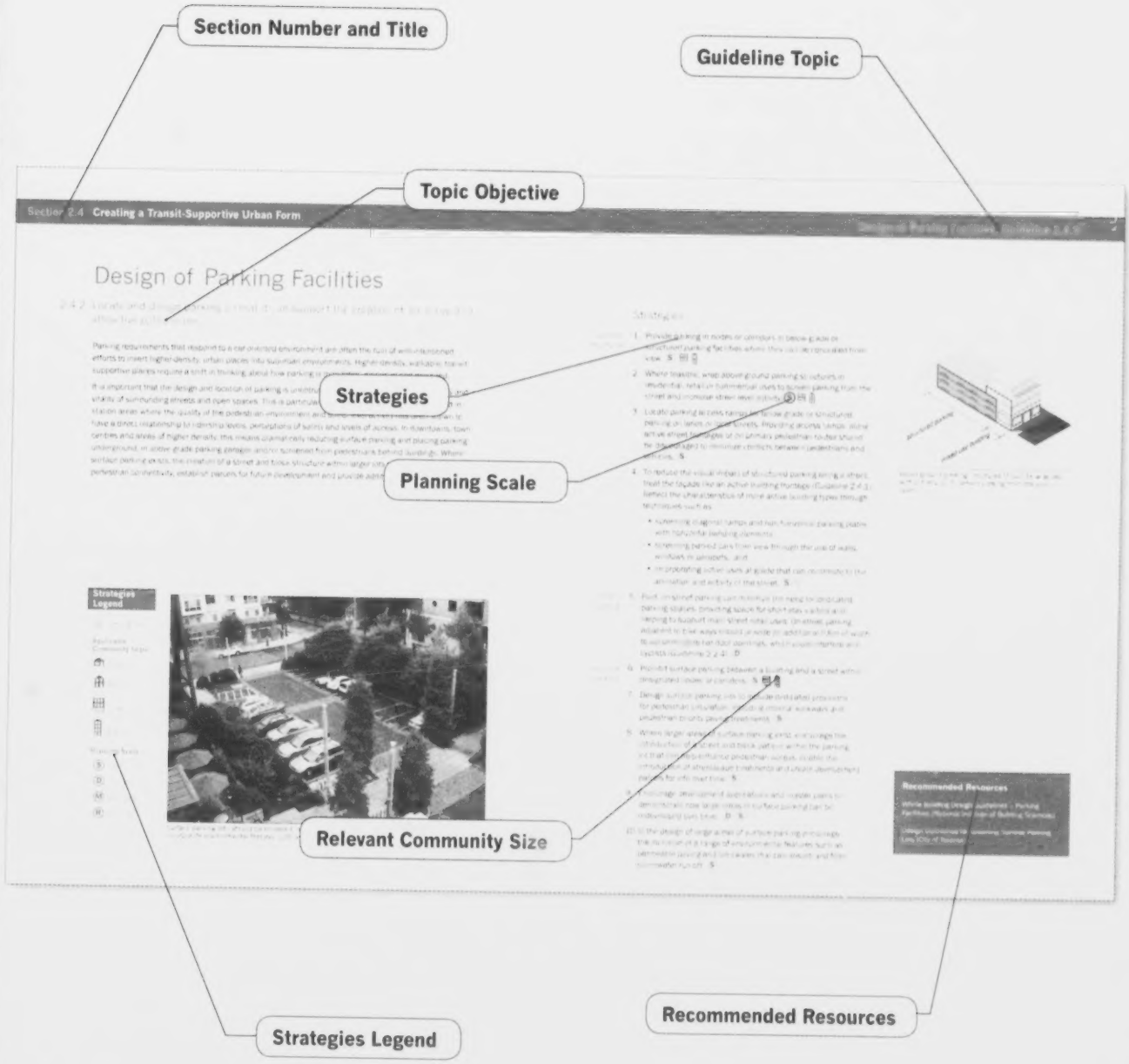
To assist with implementation, each strategy has been identified with a "planning scale" that indicates the level at which it might be implemented.

Ⓢ **Site Planning:** Site and building scale. May include issues such as site circulation and building design.

Ⓓ **District Planning:** District scale. May be implemented through plans of subdivision, district-level secondary plan processes or district-specific zoning by-laws.

Ⓜ **Municipal Planning:** Town or city-wide. May be implemented through municipal official plans and zoning by-laws.

Ⓡ **Regional Planning:** Regional Scale. Typically requires coordination between municipalities. May be embedded in regional official plans.


Section Number and Title
Guideline Topic
Topic Objective
Section 2.4 Creating a Transit-Supportive Urban Form
Design of Parking Facilities
Strategies
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Strategies Legend
Relevant Community Size
Recommended Resources

Chapter 1

Community-Wide Guidelines

The creation of transit-supportive communities requires an understanding of the broader land use and transit network considerations that have an impact on the ability to deliver efficient and effective local transit service. Chapter 1 outlines strategies related to:

- **Community Structure**
  Establishing a community structure and land use pattern that supports transit ridership (pg 9)

- **Regional Mobility Planning**
  Structuring transportation networks to support accessibility, transit operations and transit-supportive land use patterns (pg 28)

Settlement Areas

1.1.1 *Settlement areas* should be planned with an overall structure that is supportive of *transit*. This includes identifying places suitable for growth through the use of *urban boundaries* to promote *intensification* and linking built form and land use patterns to transit *infrastructure*.

Settlement areas are composed of *built-up areas* and lands planned for future growth. They are not homogenous environments, but rather a collection of distinct places, each with a unique role to play in supporting transit. By structuring settlement areas into distinct elements – *nodes*, *corridors*, built-up areas, and *designated growth areas* – growth can be directed to support the clustering of uses and activities and enable the creation of a more efficient transit network.

Achieving a *transit-supportive development* pattern within settlement areas can be assisted through the use of urban boundaries. These help provide clarity as to where future growth should occur and prevent unabated sprawl by encouraging more compact development patterns. They can also reduce land speculation in *rural areas* and provide impetus for the careful planning of new communities.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

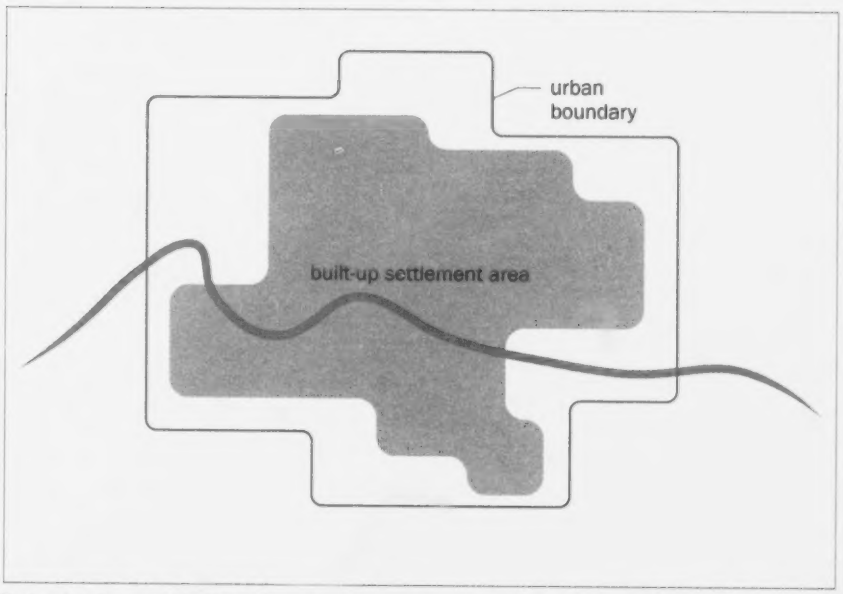
Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional



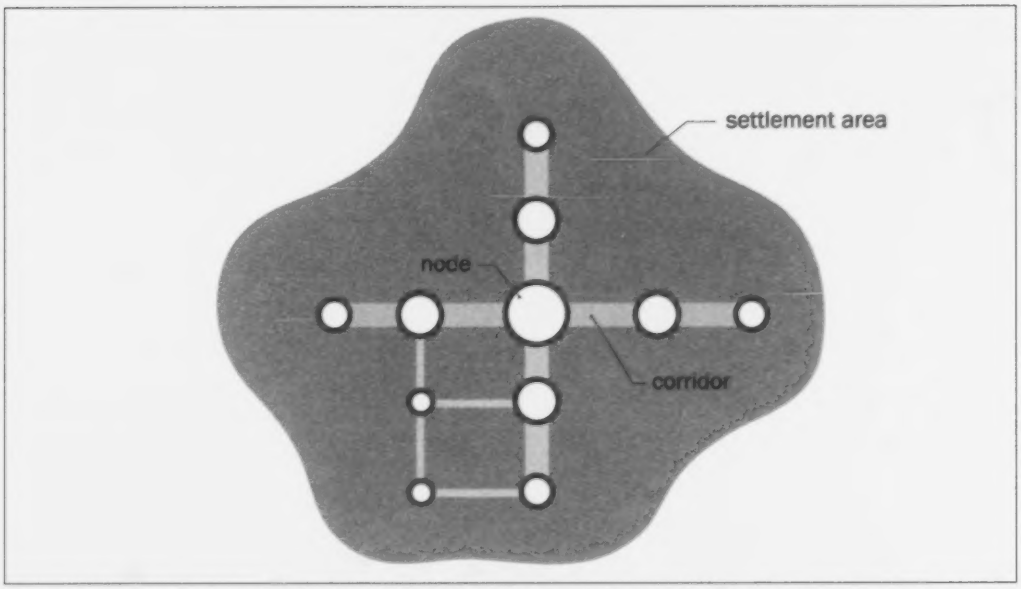
Regional and municipal official plans should designate urban boundaries in order to concentrate development within settlement areas.

Strategies:

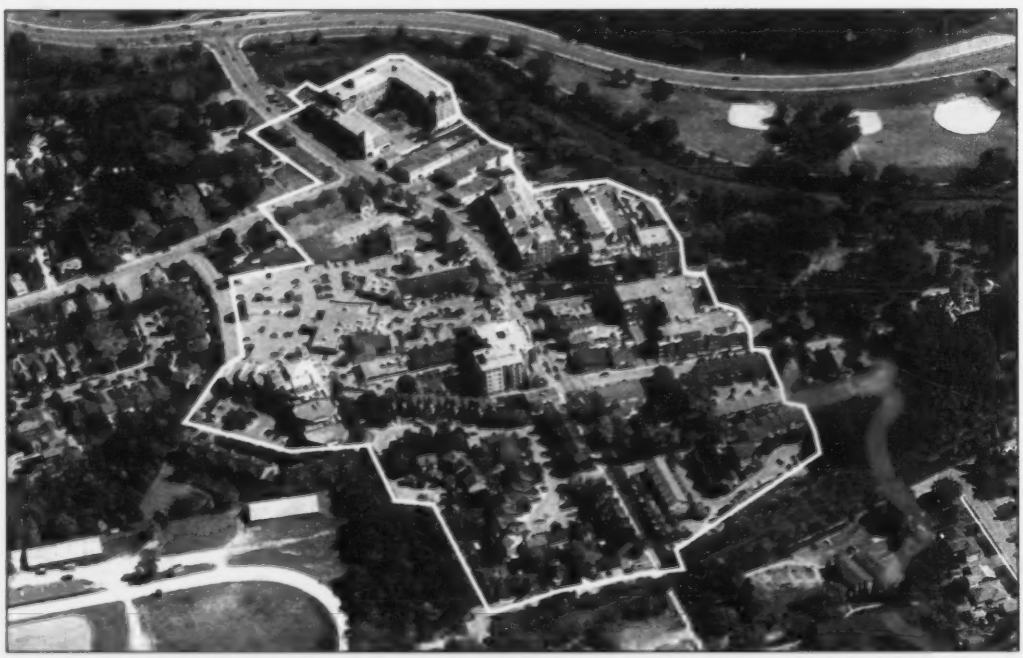
1. Contain new growth within settlement areas to strengthen and diversify existing urban and rural centres and encourage more transit-supportive development patterns. (M) (R)
2. Official plans should designate urban boundaries around settlement areas in order to concentrate development and avoid uncontrolled rural and suburban sprawl. (M) (R)
3. Urban boundaries should include a supply of land for up to 20 years. This supply should be composed of a mix of *infill* and intensification sites found within existing built-up areas and if necessary greenfield lands located within designated growth areas. (R) (M)
4. The calculation of the amount of land required within urban boundaries should be based on densities that are sufficient to support transit operations (Guideline 1.1.3). (R) (M)
5. Official plans should establish policies around the appropriate sequencing of new development within designated growth areas to ensure that new development is contiguous with existing built-up areas (Guideline 1.1.5). *Regions* and municipalities should focus development by prioritizing infill and intensification over the development of designated growth areas. (R) (M)
6. Ensure that appropriate zoning and the basic infrastructure of social and hard services (water, sewer etc.) is in place so that intensification is possible at a rate sufficient to meet market demand. (R) (M)
7. Regularly reassess the amount of land designated for urban development within an urban boundary. The assessment should review development trends to evaluate the effectiveness of the boundary in containing growth and determine the extent to which new development is approaching the target densities required to support transit ridership or as outlined within the municipality's Official Plan. (R) (M)
8. The expansion of a settlement boundary and the designation of additional land for development may only be permitted through a comprehensive review and should only occur where it has been demonstrated that densities in existing urban areas are approaching the target levels established within the Official Plans (Guideline 1.1.7). If urban boundaries are expanded before planned higher-density nodes and corridors begin to intensify, it will increase the cost of transit service, making it difficult to serve new urban areas. (R) (M)

The Growth Plan for the Greater Golden Horseshoe, 2006 is a set of policies to guide planning decisions in the Greater Golden Horseshoe over a 25 year period, focusing new growth into existing settlement areas to optimize infrastructure and curb sprawl. The plan identifies and specifies minimum density targets for 25 urban growth centres at existing nodes of activity. By establishing a framework for development and other transit-supportive policies, the plan aims to improve access to a greater range of transportation options, including transit, walking and cycling.
Growth Plan for the Greater Golden Horseshoe, 2006 (Ontario Ministry of Infrastructure)

The Growth Plan for Northern Ontario, 2011 focuses decisions and investments to build a globally competitive northern economy that is resilient and sustainable and attracts new people and investments. The plan encourages certain communities to identify strategic core areas to function as vibrant, mixed-use districts that can accommodate higher densities and attract investment, support *brownfield* development, and include a broad range of amenities (e.g. vibrant *streetscapes* and transportation connections) accessible to residents and visitors.
Growth Plan for Northern Ontario, 2011 (Ontario Ministry of Infrastructure & Ministry of Northern Development Mines and Forestry)



Within settlement areas, the designation of a series of higher-density, mixed-use nodes and corridors relating to existing and planned transit investment can help to direct and focus growth to support the clustering of uses and activities and enable the creation of a more efficient transit network.



Corridors or nodes such as the example above may take time to fully develop. If urban boundaries are expanded before these areas intensify, the cost of transit service may increase.

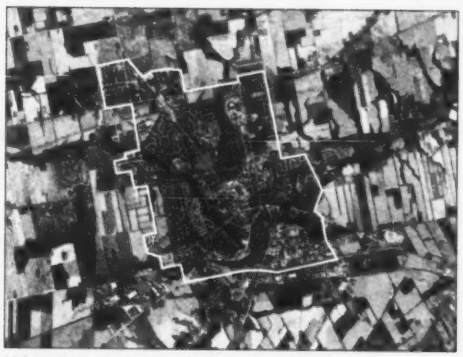
9. Site-specific amendments to permit reduced densities or non-*transit-supportive* uses at nodes and corridors should be discouraged. (M) (D) (S)

10. Avoid pre-servicing areas outside of the existing *urban boundary* with municipal sewer and water services, as this will lead to pressure for new development. (R) (M)

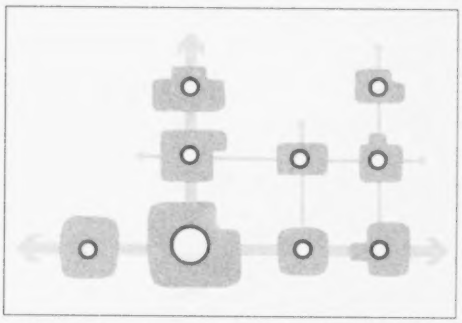
11. Incorporate a range of *residential*, commercial, retail, industrial, institutional and related employment uses within the settlement area appropriate for the community's size. This will help create relatively *self-contained communities* and reduce the need for inter-urban commuting. (M)

12. Work with regional and municipal authorities to develop an inter-urban *transit* system linking different settlement areas. This can help reduce automobile travel and reinforce a regional network of distinct communities. (M) (R)

13. Identify higher-density, mixed-use nodes (Guideline 1.1.2) and corridors (Guideline 1.1.3) within each settlement area. Tie these areas into existing and planned transit investments and vary their size and intensity according to the level of planned transit service. (M) (D)



Urban boundaries can help to promote more compact patterns of development, reducing land speculation and preserving agricultural lands in rural areas.



Linking settlement areas with an inter-urban transit system can help reduce automobile travel between settlements and reinforce a regional network of distinct communities.

Recommended Resources

Case Study: Creating a Transit-Supportive Community Structure

Provincial Policy Statement, 2005 (Ontario Ministry of Municipal Affairs and Housing)

Urban Growth Boundary (Oregon Metro)

Municipal Development Plan - Urban Structure (City of Calgary)

The Urban Network: A New Framework For Growth (Peter Calthorpe)

Transit Oriented Development Strategic Plan (City of Denver)

Nodes

1.1.2 Planning for *nodes* should take into consideration their ability to support ridership by coordinating the intensity and mix of uses alongside existing or planned levels of *transit* service.

Nodes are areas within *settlement areas* of more intense density, use and activity. They are compact clusters of uses that can range greatly in scale and may include downtowns, *mixed-use* communities, clusters of office buildings, post-secondary educational campuses or other higher-density uses both large and small. Each will have its own unique sets of characteristics related to levels and hours of activity, ridership patterns or relationship to other areas of activity within a transit system. While different nodes will typically be characterized by particular types of land uses, the provision of a mix of uses should be encouraged to balance the flow or riders across the system.

In many cities and towns in Ontario, the downtown is the primary node accommodating the widest mix of *transit-supportive* uses, including workplaces, institutions such as schools, homes and retail stores. Downtowns are often developed at a higher density than other locations within the settlement area and may contain a range of overlapping nodes covering a broad area. Though overlapping, the unique qualities of each node should be recognized, including built form, land use, user characteristics and the characteristics of neighbouring areas so that they can be planned for both as a larger grouping and as distinct areas within the downtown.

Focusing urban growth within nodes and supporting these nodes with higher levels of transit service is fundamental to linking land use and transit, reducing walking times to and from uses and supporting the more efficient delivery of transit service. As key destinations, nodes will also exert an influence on travel patterns within adjacent areas, placing increased importance on *pedestrian* (Guideline 2.2.2) and cycling (Guideline 2.2.3) routes connecting into and out of the node.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

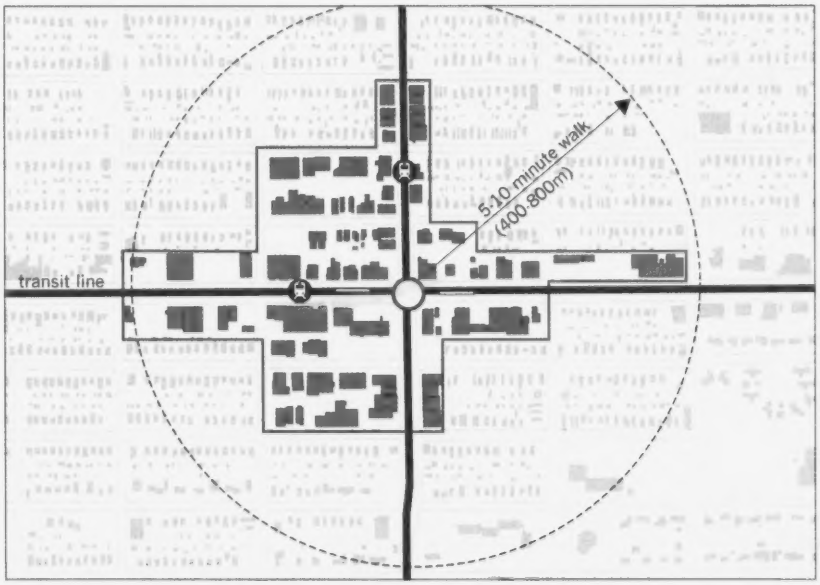
Planning Scale

(S) Site

(D) District

(M) Municipal

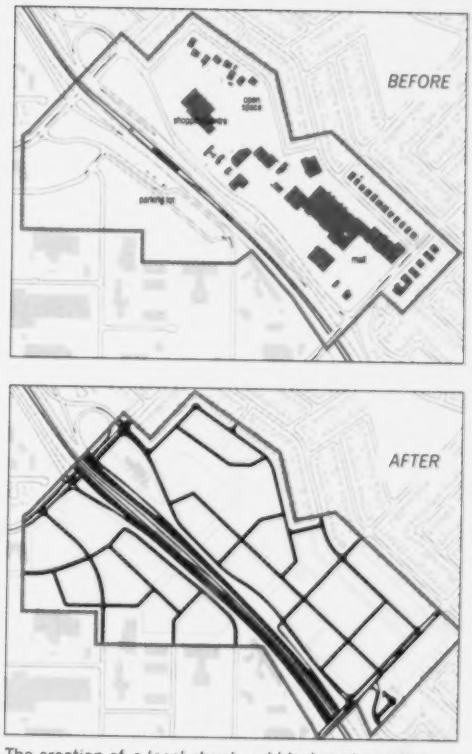
(R) Regional



The boundary of a node should reflect a 5- to 10-minute (400-800m) walk from a focal point within the transit system. Areas where change such as more intense density, use and activity are appropriate should be identified. Areas within the boundary of the node outside of these areas of change should be treated as built-up areas (Guideline 1.1.4).

Strategies:

1. Plan to develop nodes at focal points in the transit system such as intersecting *corridors* (Guideline 1.1.3), transfer points or stations (Guideline 2.6.1). Similarly, when planning new transit routes, focus transfer points and stations within existing or proposed nodes. (M) (D)
2. The boundary of a node should generally reflect a 5 to 10 minute (400-800m) walk from a focal point within the transit system. Work with communities to identify areas where change such as more intense density, use and activity are appropriate. Areas within the boundary of the node outside of these areas of change should be treated as *built-up areas* (Guideline 1.1.4). (D)
3. Encourage a density and mix of uses at nodes that is appropriate for the existing or planned level of transit service and planned function of the node. Locate the largest, most densely developed nodes at major focal points in the transit system. In small settlement areas, this will usually be the downtown business *district*. (R) (M) (D)
4. Identify new nodes where they can strengthen existing land use anchors, such as a shopping centre, hospital, employment use, community facility or *major transit station*. Where existing nodes have potential for *intensification*, encourage new development to locate within them to take advantage of existing activities and transit *infrastructure*. (R) (M) (D)
5. Provide a full range of uses including employment, retail, recreational, cultural, institutional, personal services and other uses that will help support transit ridership. When locating new land use anchors, preference should be given to existing nodes as long as the new anchor will be capable of contributing to the existing or planned character of the area. (R) (M) (D)
6. Incorporate residential uses within nodes to balance ridership levels in all directions. (M) (D)
7. Discourage automobile-oriented uses such as drive-throughs, which detract from the character and function of nodes and negatively affect the pedestrian environment. (M) (D)
8. The planning or retrofit of nodes should establish a transit-supportive local street and block pattern (Guideline 2.2.1), and consider the implementation of a range of district-level and site-specific initiatives (Chapter 2) to support transit. (D)
9. Provide an appropriate transition of use, intensity and scale from higher-density nodes to surrounding areas. (D)
10. Encourage the preservation of cultural heritage resources, for example through the adaptive re-use of structures. Discourage the demolition of heritage sites. (M) (D)
11. Municipalities should prepare detailed secondary or district plans for nodes to guide their development into more transit-supportive places. These should consider modes of transportation, the *public realm*, land use and built form. (M)



The creation of a local street and block system within nodes is an important strategy that helps to balance patterns of movement, enhance connections to transit and between adjacent areas and establish a pattern for *intensification* over time.

Recommended Resources

Case Study: Station Intensification

Ontario Heritage Tool Kit (Ontario Ministry of Tourism and Culture)

Mobility Hub Guidelines (Metrolinx)

Tall Buildings Study (City of Toronto)

Corridors

1.1.3 Major *transit* routes should be planned and developed as medium and high-density *corridors*. They are places to concentrate growth and *intensification* in immediate proximity to transit.

Corridors have similar characteristics to nodes, including an intensity and mix of uses, but are oriented along major transit routes. Corridors can also be key routes between nodes, creating continuous *transit-supportive* environments linked to transit infrastructure. Existing corridors can be reinforced through *infill* and *redevelopment* and supported with investments in enhanced transit service. The designation and development of corridors needs to take into consideration both existing and future transit services.

Transforming high-volume arterials into transit-supportive corridors takes time. Higher vehicular speeds and volumes often found on corridors can present challenges to developing a *pedestrian-* and transit-supportive environment. The automobile-oriented nature of many of these roads is often reinforced by surrounding uses, which are set back from the street and are developed at low densities. Developing a new corridor typically requires the introduction of a major transit route, the rebalancing of street *rights-of-way* to be friendlier to pedestrians, cyclists and transit users and the introduction of medium- to high-density buildings directly fronting the street. Where there is a predominance of automobile-oriented uses such as drive-throughs or shopping plazas, land use strategies should focus on the development of higher-density nodes (Guideline 1.1.2) at key centres of activity rather than dispersing density and activities along the length of the corridor. Not all corridors will be the same and the designation of corridors should account for differences in levels of transit service, differences in the ability to support new uses and/or higher densities and surrounding land use characteristics. Municipalities should identify a range of corridors that can respond to these different characteristics and develop policies to support the objectives for each.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

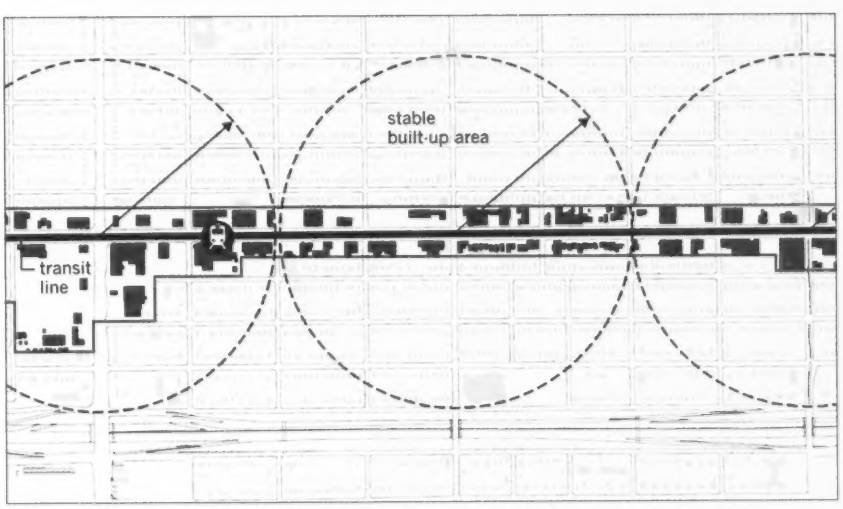
Planning Scale

(S) Site

(D) District

(M) Municipal

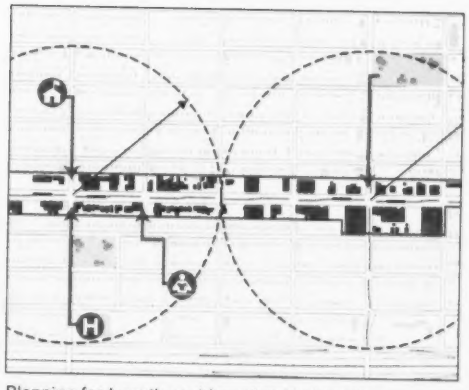
(R) Regional



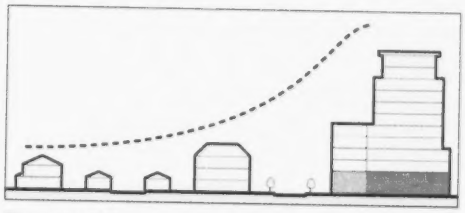
The boundaries of a corridor should reflect a 5- to 10-minute (400-800m) walk from focal points within the transit system. The diverse nature of corridors will mean that they should contain a range of building types and densities along their length which can respond to the scale and intensity of surrounding neighbourhoods.

Strategies:

1. Designate and develop corridors along important transit routes and in particular along streets connecting two or more nodes. In many cases this will correspond with arterial routes. Conversely, the planning of new transit routes should be coordinated with an understanding of existing or planned corridors to ensure that levels of transit service to those areas are enhanced. (R) (M)
2. Not all arterials should be designated as corridors. Where arterials have a predominance of automobile-oriented uses, planning efforts should focus on the establishment of transit-supportive nodes (Guideline 1.1.2) around key transit stops or station areas or in areas with higher levels of activity. (M) (D)
3. Establish the boundaries of a corridor based on a 5 to 10 minute (400-800m) walk from transit stops or stations located along the corridor. Appropriate distances will generally be determined by the level of transit service (Guideline 2.3.1). Work with communities to identify areas where change such as more intense density, use and activity are appropriate and treat places outside of these areas as *built-up areas* (Guideline 1.1.4). (D)
4. Plan for a node where corridors intersect (Guideline 1.1.2). (R) (M)
5. Identify density targets for corridors, including minimum targets that should be met before expansion of the *settlement area*. In general, locate the highest densities on a corridor close to stop or station areas or close to the intersection of transit routes. (M) (D)
6. Provide a full range of *main street* uses including retail, cultural, institutional, residential, personal services, offices and other uses to support transit ridership. (M) (D)
7. Discourage automobile-oriented uses such as drive-throughs along corridors with high levels of transit service. These uses can detract from the character and function of corridors and discourage walking. (M) (D)
8. Corridors will contain a range of densities along their lengths. Provide an appropriate transition of use, intensity and scale from higher-density corridors to surrounding areas. (D)
9. Corridors are rarely homogenous and may contain numerous distinct areas along their routes. Planning for corridors must consider these distinct characteristics and plan for a corresponding range of buildings, uses, and open spaces. (D)
10. Planning for transit corridors should strengthen connections between surrounding areas on either side of the corridor and transit services. This can be accomplished through a range of *district*-level and site-specific initiatives (Chapter 2). (D)
11. Encourage the preservation of cultural heritage resources, for example through the adaptive re-use of structures. Discourage the demolition of heritage sites. (M) (D)
12. Municipalities should prepare *secondary plans* or corridor studies to effectively guide *transit-supportive development*, including consideration of all modes of transportation, the *public realm*, land uses and built form. (M) (D)



Planning for transit corridors should strengthen connections between surrounding areas on either side of the corridor and transit services.



There should be a transition of use, intensity and scale from higher-density corridors to adjacent neighbourhoods.

Recommended Resources

Case Study: Corridor Planning

Ontario Heritage Tool Kit (Ontario Ministry of Culture)

Avenues and Mid-Rise Buildings Study (City of Toronto)

Central Corridor Development Planning & Strategy (City of Saint Paul)

Calgary Southeast 17 Corridor – Land Use and Urban Design Concept (City of Calgary)

Built-Up Areas

1.1.4 The retrofit of *built-up areas* through *intensification* and *infill* development combined with street and open space improvements can enhance overall mobility and in particular, the efficiency of *transit* service. Where larger *redevelopment* opportunities exist, a pattern of streets, blocks, buildings and open spaces that is supportive of transit should be established.

Built-up areas are those areas that have already been developed within the established *settlement area*, but may not be designated as higher-density nodes or *corridors*. These areas constitute the largest proportion of the settlement area and in many communities are where the majority of people live. Built-up areas have a wide variety of characteristics, from low-density residential neighbourhoods to industrial lands, and vary in the degree to which they are *transit-supportive*.

In many cases, intensification and infill consists of small changes, such as the addition of second units. Larger opportunities may include former industrial or commercial properties that are underutilized or vacant. Redevelopment of these lands may be complicated by potential environmental contamination. However, efforts to reuse and redevelop such *brownfield* locations are encouraged, as they are often in strategic locations, with infrastructure in place that can support a variety of potential uses. Other opportunities may be found in post-war neighbourhoods, where high rise apartment towers often provide a critical mass of existing transit users. These towers generally sit on large land parcels that have significant intensification potential. The sites frequently lack sufficient *pedestrian* amenities and direct routes to transit. Sensitive site redevelopment and street-related infill projects such as town houses and *mixed-use*, mid-rise buildings can greatly improve the pedestrian experience and add new transit users to the area.

Stable built-up areas are important to the quality of life in our towns and communities. Preserving the function of built-up areas while encouraging incremental changes that support transit ridership will help maintain desired characteristics while supporting more comprehensive community-wide measures in support of transit.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

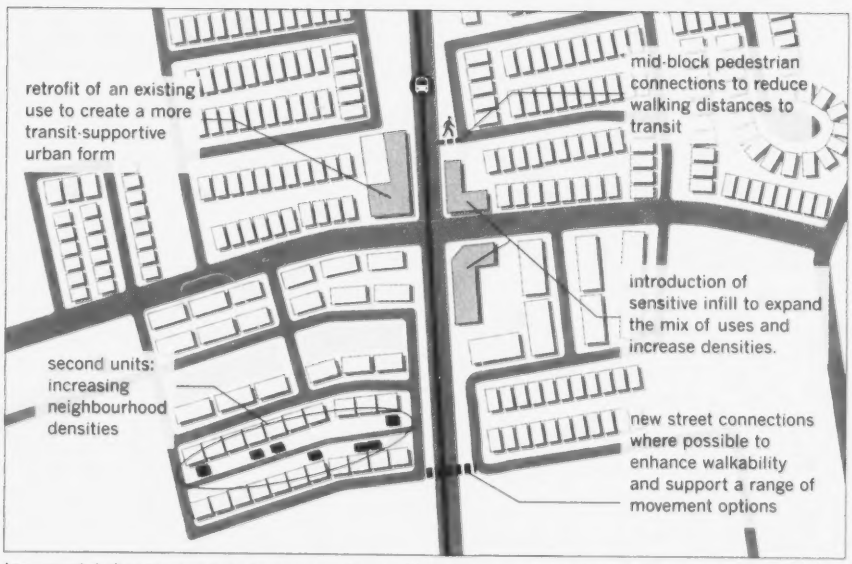
Planning Scale

(S) Site

(D) District

(M) Municipal

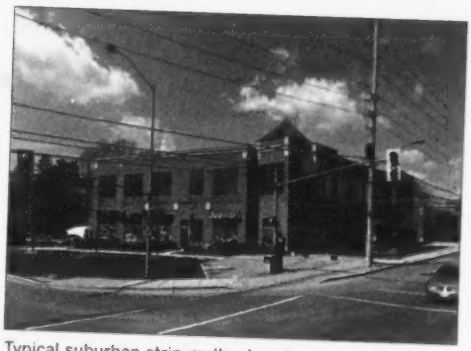
(R) Regional



Incremental changes can help to preserve the positive characteristics and function of existing built-up areas while supporting transit ridership.

Strategies:

1. Protect the positive qualities of built-up areas while supporting ongoing change such as sensitive infill that can enhance the transit-supportive nature of these areas. (M)
2. Encourage sensitive infill development through:
   - policies supporting the creation of second units in low-density residential areas that can help to raise overall neighbourhood densities; and/or
   - the retrofit or redevelopment of existing uses such as strip malls or other automobile-oriented uses to establish a more transit-supportive urban form. (M) (D) (S)
3. Assess *brownfields* and *greyfields* for potential redevelopment. These properties are often located in built-up areas near transportation networks. Cleaning and rehabilitating these lands for productive uses, such as offices and recreation centres, can contribute to revitalizing neighbourhoods and building more sustainable communities. (M) (D)
4. Plan larger redevelopment areas using a transit-supportive pattern of built form and land use (Section 2.4) with a local street and block network (Guideline 2.2.1) that can enhance connections to transit services. (D) (S)
5. Situate transit generating uses such as shopping centres, higher-density housing, employment uses or institutions close to existing or planned transit routes. (M) (D)
6. Improve pedestrian and cycling infrastructure to increase convenient and comfortable access to transit. This is particularly important in post-war suburban neighbourhoods and employment areas where densities are low and distances between uses are greater. (M) (D) (S)
7. Create additional street connections where possible that can help to minimize travel distances to transit. When new street connections cannot be made, *mid-block pedestrian connections* can minimize walking distances for transit users. (M) (D) (S)
8. Coordinate transit routes between municipalities and plan them so that they serve neighbourhood focal points such as *main streets* or key clusters of activity to shorten travel distances to transit service and optimize efficiency. (M) (D)
9. Municipalities should establish guidelines for infill development, *secondary plans* and/or *district* plans for larger redevelopment opportunities to ensure that new development is compatible with surrounding uses and supportive of transit (Implementation: The Planning Process). (M) (D)



Typical suburban strip malls place large areas of surface parking between transit users and their retail services. The redeveloped strip mall beside a planned rapid transit corridor in Mississauga, above, has been re-oriented to support transit ridership by locating uses adjacent to the transit stop.

Kaufman Lofts is an example of brownfield redevelopment in Kitchener. A former footwear manufacturing building, the re-adapted building now contains residential units and commercial space.

Recommended Resources

A Practical Guide to Brownfield Redevelopment in Ontario (Ontario Ministry of Municipal Affairs and Housing)

Brownfields Ontario (Ontario Ministry of Municipal Affairs and Housing)

Infill Development – Strategies for Shaping Livable Neighborhoods (Municipal Research & Services Center of Washington)

Infill Townhouse Guidelines (City of Toronto)

Designated Growth Areas

1.1.5 The planning and design of *designated growth areas* should be coordinated alongside planned long-term investments in transit to ensure that new development is transit supportive.

Designated growth areas are municipal lands that are currently not urbanized but are designated as places where development is anticipated and planned. Development should be focused inward, with an emphasis on *intensification*, *infill* and *redevelopment*, before expanding the *built-up area*. However, in growing Ontario towns and cities, most growth does occur at the edge of the urbanized area, in designated growth areas. It is therefore critical to ensure that designated growth areas anticipate transit as an important service in the community so that they are planned for efficient transit operation and can support higher levels of transit ridership.

It can be challenging and expensive to provide transit in low-density areas which require residents and employees to travel long distances to access employment and other destinations. The establishment of well-connected road networks, a mix of uses, higher densities and implementation of other transit-supportive strategies within designated growth areas are essential to allow transit to operate effectively from the beginning, making it a viable transportation choice.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

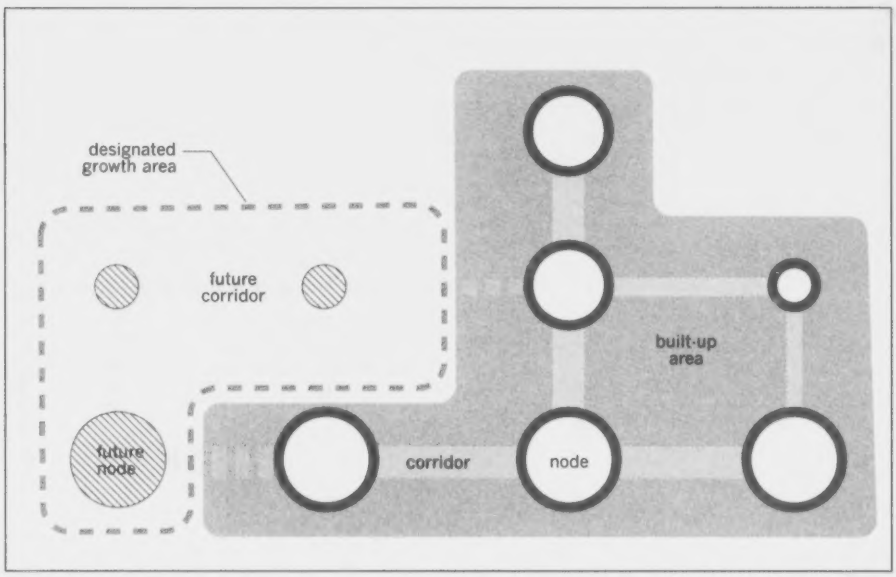
Planning Scale

(S) Site

(D) District

(M) Municipal

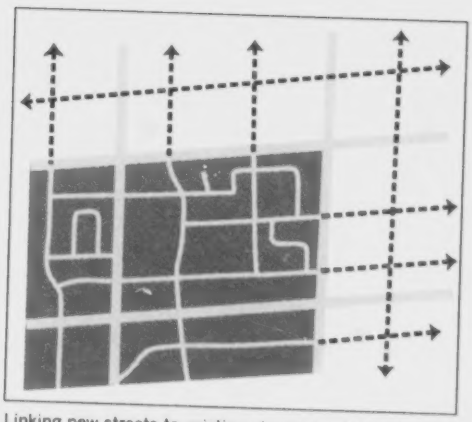
(R) Regional



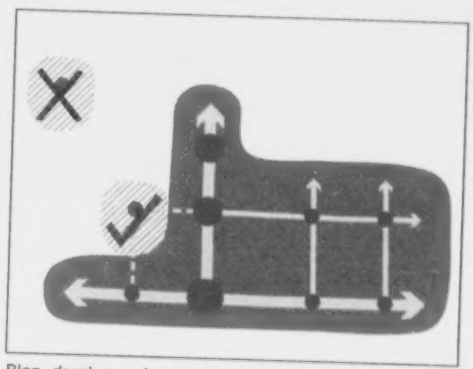
The planning of designated growth areas should identify higher-density, mixed-use *nodes* and *corridors* that vary in size and intensity according to the level of planned transit service.

Strategies:

1. Align the planning, design and development of designated growth areas with planned transit investments to ensure that they are mutually supportive of each other. (R) (M) (D)
2. Plan, develop and sequence designated growth areas so that they are adjacent to and act as extensions of existing built-up areas. Avoid *leap-frog development*. Phase in expansion of transit services to serve the majority of residents and businesses as growth areas develop and mature. (R) (M) (D)
3. The planning of designated growth areas should identify higher-density, *mixed-use nodes* (Guideline 1.1.2) and *corridors* (Guideline 1.1.3). These should relate to existing and planned investments in transit and vary in size and intensity according to the level of planned transit service. (M) (D)
4. Structure new communities such that at least 90% of all people/jobs are within a 400 m (5 minute) walking distance of a transit stop. (M) (D)
5. New streets should be connected to existing streets in adjacent developments. Where developments cross or border municipal boundaries, extend connections into adjacent municipalities to support regional mobility. Future connections to lands that have yet to be developed should be anticipated and planned for that purpose. (D) (S)
6. Plan designated growth areas with a mix of uses so that people can meet most of their daily needs without having to leave their community. (M) (D)
7. Situate community amenities such as shopping centres, community centres, recreational facilities, schools and places of worship on or close to transit routes (Guideline 1.1.7). (M) (D)
8. Ensure new communities are of sufficient density to make transit service feasible and efficient. (M) (D)
9. Establish *minimum density thresholds* where they currently do not exist at a level that is transit-supportive (Guideline 1.1.7). Generally, designated growth areas should accommodate a minimum of 50 people/jobs per hectare, with higher minimum densities in identified nodes and corridors. (R) (M) (D)



Linking new streets to existing streets in adjacent developments can improve connectivity and transit service efficiency.



Plan, develop and sequence designated growth areas so that built-up areas are contiguous. Avoid leap-frog development.

Recommended Resources

Case Study: Creating a Transit-Supportive Community Structure

Urban Design Guidelines for Greenfield Neighbourhoods (City of Ottawa)

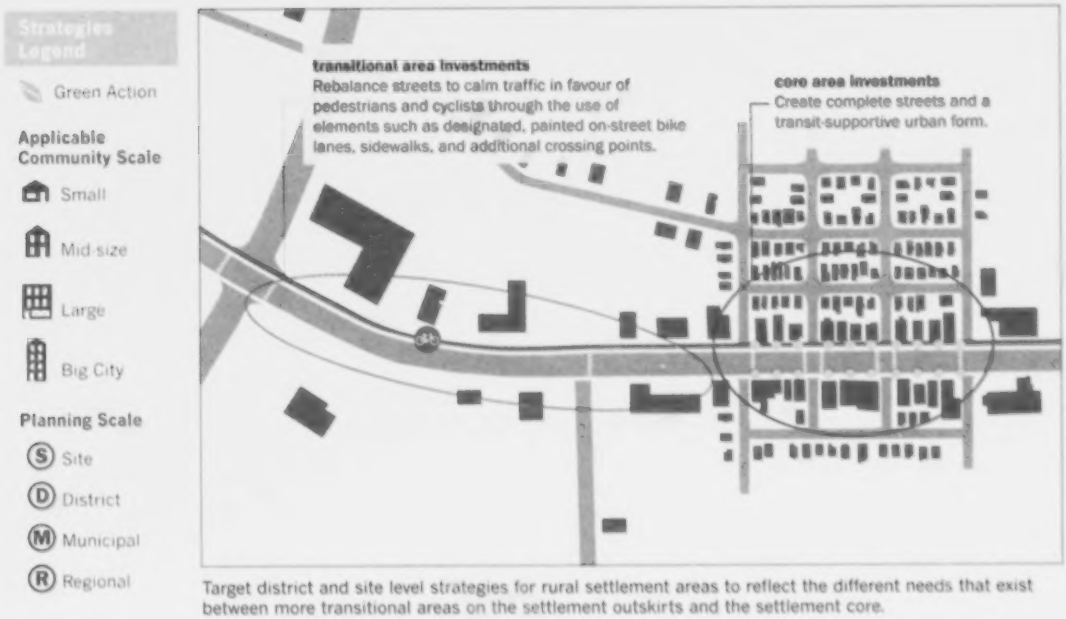
Rural Settlement Areas

1.1.6 Growth in rural areas should be concentrated in rural settlement areas, conserving important countryside and natural areas and creating clusters of uses capable of supporting rural transit services.

The introduction of transit and more *transit-supportive* development in rural settlement areas, smaller settlements located in countryside, natural, or prime agricultural areas, represents an important opportunity to enhance mobility for rural users, creating environments that are more *pedestrian*-friendly and improving access to local services.

Growth and change need to be effectively managed to make transit viable. Often, residents from surrounding agricultural areas come to rural settlement areas to meet their daily needs. Similarly, people in rural settlement areas often travel to other rural settlement areas or to larger towns or cities for employment or to access amenities that are not available locally. In this environment, transit in the form of commuter services or *centre-to-centre buses*, *community transportation* and demand-responsive transit has a significant role to play in moving people.

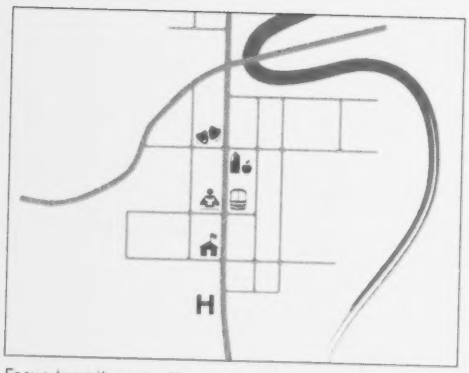
One of the most significant transportation issues in rural settlement areas is that these areas are often designed to be accessed primarily by private automobile. This severely limits young people and seniors' ability to access local services and/or participate in local activities and has been linked to a higher risk of obesity. Developing *complete streets* and implementing other strategies that meet the needs of all users and age groups can help to enhance mobility for youth and seniors with no alternative transportation options.



Target district and site level strategies for rural settlement areas to reflect the different needs that exist between more transitional areas on the settlement outskirts and the settlement core.

Strategies:

1. Designate appropriate growth areas in settlement areas and rural settlement areas. R M
2. Establish policies to limit residential development outside of designated settlement areas. This will help rural areas maintain their character and will direct growth to centres that have greater potential to support transit service. R M
3. Protect natural areas and their ecological functions from development. Maintain, restore and enhance these areas where possible. R M
4. Cluster transit-supportive uses such as schools, community centres, places of worship, health facilities, and shopping centres within a 5-10 minute walking distance (400-800m) of each other, where possible, and where transit service is available. Concentrating these uses helps create a critical mass of potential transit users necessary to make services viable, enabling centre-to-centre transit services capable of facilitating convenient day trips between centres. When considering opportunities to implement this strategy, ensure that the proposed concentration of uses is appropriate to the type of water and sewage services available in the area. A range of rural transit service strategies can be found in Guideline 3.1.1. R M
5. Dispersed strip development along rural roads is difficult to serve by transit and should be limited. M D
6. Given the lower densities of rural areas, target *district*-level and site-specific mobility enhancement strategies (Chapter 2) in rural settlements. Generally, rural settlements can be understood as having two distinct characteristics:
   - A settlement core: the heart of the rural settlement, containing the highest concentration of people. Here there should be a focus on creating complete streets, strengthening pedestrian and cycling connections to key destinations and creating a transit-supportive urban form.
   - A transitional area: between a core and its rural surroundings. Strategies here should focus on traffic calming and *streetscape* enhancements in favour of pedestrians (Guideline 2.2.3) and cyclists (Guideline 2.2.4). D S
7. Establish *active transportation* routes and infrastructure to enable people to travel longer distances to reach transit or key destinations. This can be done, for example, by transforming paved shoulders into paved and signed designated bike lanes. Recommended minimum bikeway shoulder widths, which depend on operating speeds, truck and general traffic volumes, are provided in the Ontario Bikeways Planning and Design Guidelines. M D



Focus transit-supportive uses such as schools, community centres, health facilities, places of worship, and shopping centres in rural settlement areas to support the more efficient provision of transit service.

Transforming paved shoulders into designated bike lanes, in line with the Ontario Bikeways Planning and Design Guidelines, can enable people to travel longer distances to reach transit.

Recommended Resources

Case Study: Rural Transit

Planning Policy Statement #7: Sustainable Rural Development (Communities and Local Government)

Guidebook for Change and Innovation at Rural and Small Urban Transit Systems (Transportation Research Board)

Child and Youth Friendly Land-use and Transport Planning Guidelines in Rural Areas (The Centre for Sustainable Transportation)

Ontario Bikeways Planning and Design Guidelines (Ontario Ministry of Transportation)

Coordination of Transit and Land Use

1.1.7 Land uses should be coordinated alongside existing and proposed *transit* networks to ensure that appropriate densities and a mix of uses are provided in proximity to transit service. Similarly, planned transit investments should aim to support existing and planned land use patterns by providing greater levels of service to denser areas.

Creating *transit-supportive* communities relies on the effective coordination of land use and transit so they are mutually supportive. When transit and land use decisions are made in isolation, it can result in patterns of development that are difficult and inefficient to serve by transit.

As residential and employment densities increase, the number of passengers per route-kilometre increases and a higher level of transit service can be cost-effective. Improved frequency and convenience of service has positive impacts on transit ridership, thereby further improving revenue/cost ratios and permitting even higher levels of service. Higher densities and a greater mix of uses in proximity to transit services help to reduce travel distances between uses and minimize walking distances. From a trip generation perspective, a greater mix of uses with a healthy *residential/employment balance* can reduce longer distance commuting, enabling a greater number of trips to be maintained within *regions* or municipalities and encouraging greater use of transit services. While higher residential densities in proximity to transit can help to promote ridership, if destinations are dispersed and the mix of uses limited, the provision of suitable transit service becomes more challenging. In some instances the concentration of jobs within an area, which can provide a key destination for transit riders, has more influence on ridership than residential densities. Consideration of both densities and mix of uses is required to determine the viability of a transit line or network.

Strategies Legend	Transit service type	Suggested minimum density
Green Action	Basic Transit Service	
Applicable Community Scale	Frequent Transit Service	
Small	Very Frequent Bus Service	
Mid-size	Dedicated Rapid Transit	
Large	Subway	
Big City		
Planning Scale		
(S) Site		
(D) District		
(M) Municipal		
(R) Regional		

The table above illustrates suggested *minimum density thresholds* for areas within a 5-10 minute walk of transit capable of supporting different types and levels of transit service. The thresholds presented are a guide and not to be applied as standards. Other factors such as the design of streets and open spaces, building characteristics, levels of feeder service, travel time, range of densities across the network and mix of uses can also have a significant impact on transit ridership. *Mobility hubs* and major transit station areas may require higher minimum densities.

Strategies:

1. Plan for transit service as a necessary utility to support land use similar to water, electricity and roadways. As such, the provision of transit service should be a primary consideration in all developments and assessed as a component of the development approvals process. (R) (M)

2. Plan for a level of transit coverage and service which is competitive with average automotive commuting times, including time walking to and from transit service. See Section 3.1 for more strategies to optimize system service and capacity to meet community needs. (R) (M)

3. Official plans should be developed in concert with municipal or regional transportation plans with a special focus on how to link land uses and transit services. (R) (M)

4. Official plans should establish a transit-supportive land use pattern by identifying an urban structure of higher-density *nodes* (Guideline 1.1.2) and *corridors* (Guideline 1.1.3). Generally, a broad mix of uses should be encouraged throughout all urban areas with a greater mix of uses at nodes, along corridors and in rural *settlement areas*. (M)

5. Official plans should designate target densities capable of supporting transit ridership and should outline an appropriate mix of uses for nodes, corridors and *built-up areas*. There should be a positive correlation between levels of transit service and higher-density development to ensure that the maximum number of potential users is located within close walking distance of transit services (Chapter 4). (R) (M)

6. Locate a wide variety of high trip-generating uses, particularly those frequented by transit-dependant individuals, close to existing and/or planned transit stops or stations in order to increase route efficiency, promote vibrant station areas and enhance user access. Uses that should be encouraged along transit routes and around stops or station areas include:

   - institutional uses such as hospitals, seniors housing or community facilities;
   - entertainment uses such as theatres, bars/nightclubs and cultural facilities;
   - higher-density employment uses such as offices and hotels;
   - educational institutions such as local schools, high schools, colleges and universities;

The Metro 2040 Growth Concept for the Portland Region in Oregon establishes a regional framework for growth that integrates decisions relating to land use and transportation. The Growth Concept concentrates residential and commercial development in a series of mixed-use centres, along main streets and corridors where there are existing or planned investments in rapid transit.

The development of a series of higher-density, mixed-use nodes at and around subway stations has been a key factor in the high levels of ridership along Toronto's Yonge and University/Spadina subway lines. This has helped to reduce travel time between uses and create more vibrant station areas.

- social services such as day care centres, doctors offices and clinics;
- recreational facilities such as fitness centres and arenas;
- retail uses such as restaurants, shops and services; and
- medium to higher-density residential uses, particularly affordable/social housing. (R) (M) (D)

7. Locate active, street-level uses such as shops and services at stops, in station areas or along streets and paths leading to and from *transit* facilities to provide easier access to these services and promote higher levels of pedestrian activity. (D) (S)

8. Discourage low-density employment uses such as auto wreckers, warehousing and storage facilities, and auto-oriented uses such as gas stations, service centres and drive-through establishments from locating in proximity to transit stops or in station areas. (R) (M) (D)

9. Plan to locate multiple functions such as a mix of employment, retail and residential uses along transit routes and corridors to increase transit destinations and support the viability of the transit network. (R) (M)

10. Consult with transit agencies and the local development community to determine appropriate densities for employment and residential uses capable of supporting existing and planned investments in transit. (R) (M)

11. Transit agencies should work towards making other municipal and regional departments and provincial agencies aware of their needs and play an active role in everyday decision-making related to land use planning and land use proposals. A comprehensive list of areas where transit agencies should play an active role is outlined in Chapter 4 under Planning Process. (M) (D) (S)

12. To effectively integrate land use and transit planning, there should be a coordination of municipal/regional/provincial and transit planning activities, including review of proposed densities and road networks by transit planners, to ensure optimized bus routing; preliminary planning of future bus routes and bus stops, and opportunities to propose requirements for developers to incorporate transit infrastructure, such as stop facilities, into development plans. (R) (M)

The City of Ottawa Official Plan

The City of Ottawa's new official plan directs growth to a series of higher-density, mixed-use nodes and corridors served by existing and planned transit services. The central area will remain the focus within the transit system, containing the highest density development. Radiating out from the central area is a planned network of corridors intended to accommodate cross-town transit commuters and act as local destinations within the system.

Official Plan (City of Ottawa)

Recommended Resources

Case Study: Creating a Transit-Supportive Community Structure

Case Study: Growing Transit Ridership

Designing with Transit (Alameda-Contra Costa Transit District)

Effects of TOD on Housing, Parking and Travel (Transit Cooperative Research Program)

Transportation Trends and Outlooks for the Greater Toronto Area and Hamilton – Needs and Opportunities (IBI Group)

Layout, Spacing and Design of Arterials and Collectors

1.2.1 The layout and spacing of *arterial* and *collector* streets should seek to establish a fine grained, interconnected network capable of accommodating the efficient provision of *transit* and enhancing connections for transit users.

In Ontario, arterial roads are typically laid out following the historic 1¼-mile (2 km) concession road grid. Collector roads within the grid of arterials provide a second layer of road network. As the principal locations of transit service in many communities, the layout, spacing and design of arterials and collectors have a major influence on the ability of a community to support transit and the efficiency and effectiveness of the overall transportation network. When arterial and collector networks are spaced too far apart and designed as indirect automobile-oriented *corridors* with limited connections, it affects the efficiency and accessibility of transit networks and can decrease transit ridership.

Ensuring that arterials and collectors are designed to provide direct routes between areas is important to enable efficient, direct transit service. Between arterials, the introduction of a finer-grained network of collector streets capable of accommodating transit will help to minimize walking distances from transit facilities to area destinations.

Note that the role and function of provincial highways differs from that of municipal roads. Therefore, references to suggested intersection spacing within this guideline are for municipal urban roads. Intersection spacing requirements are greater on provincial highways in order to maintain higher operating speeds and a higher level of mobility for through traffic movement. Please contact the Ministry of Transportation regarding its intersection spacing requirements on provincial highways.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

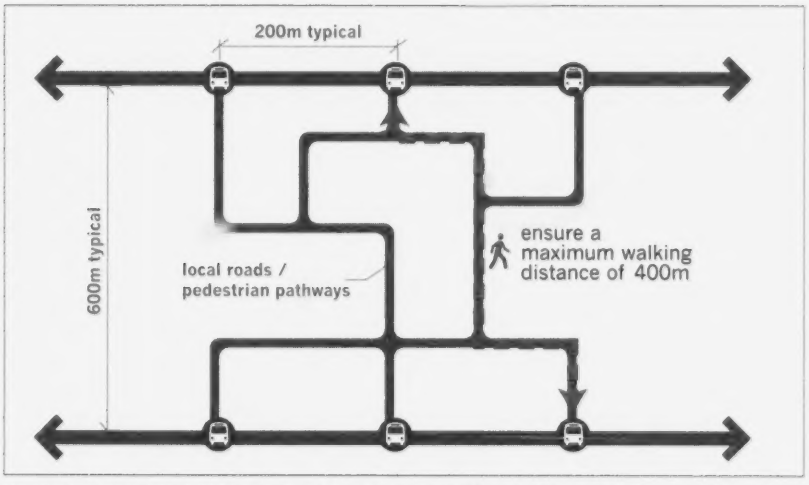
Planning Scale

(S) Site

(D) District

(M) Municipal

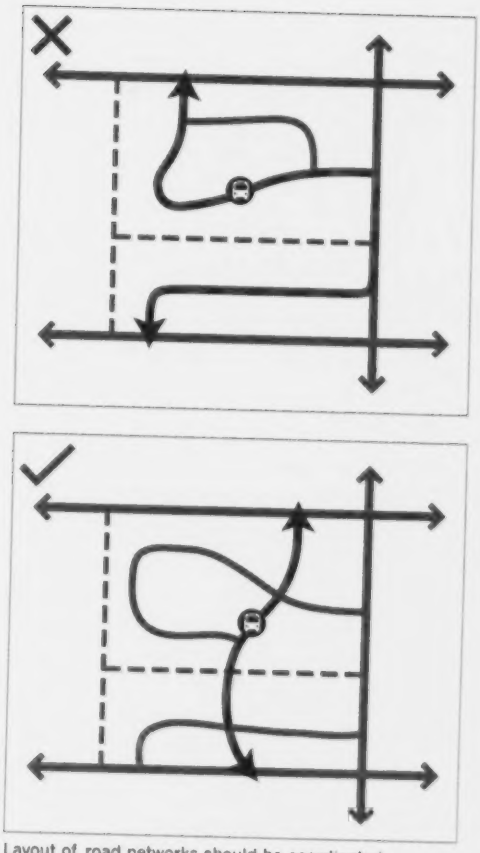
(R) Regional



If collectors are placed 600m apart and local bus stops are provided every 200m, it is possible for nearly all residents to be within a 5-minute walk (400m) of a transit stop. Access routes to transit stops from the interior blocks may follow *pedestrian pathways* or *local roads*, as appropriate. See Guideline 2.1.1 for further considerations related to design and maintenance of pedestrian walkways.

Strategies:

1. Arterial and collector road networks should be planned on a municipal scale to ensure that adjacent developments, people and jobs are effectively linked with direct, transit-compatible roads. (M)
2. The classification of arterials and collectors should include transit types, with unique *right-of-way* standards to facilitate rapid or conventional transit routes, walking and cycling. (M) (R)
3. The layout of arterials and collectors should provide as direct a route as possible in order to minimize trip lengths and travel times and avoid backtracking. Layout of road networks should be coordinated between subdivisions and neighbourhoods to eliminate unnecessary jogs or breaks in the network. (R) (M) (D)
4. The layout of arterials and collectors should attempt to maximize connections by establishing a fine grain of streets and blocks capable of dispersing traffic and reducing traffic volumes on primary streets. (R) (M) (D)
5. Transit routes, as well as the arterials and collectors that carry them, should be spaced to avoid duplication between routes while providing full coverage. (R) (M) (D)
6. The spacing of arterials and collectors should support a maximum 400 metre (5-minute) walk from the interior of a block to a local bus stop. For example, assuming that bus stops are spaced 200m apart along a set of parallel collectors, the collectors should be no more than 600m apart to satisfy this maximum walking distance. (M) (D)
7. Space collectors at intervals of 400 m or less in designated *nodes* and *corridors* in order to facilitate higher levels of walking and cycling. (M) (D)
8. Access routes to transit stops, such as *pedestrian* pathways or *local roads*, should be spaced no greater than 200m apart in order to minimize walking distances to local transit stops. Spacing of less than 200m is desirable to enhance connectivity. (M) (D)
9. The design of arterials and collectors should consider and balance a range of factors including the existing and planned land use and urban form, the movement of goods and the needs of pedestrians, cyclists, transit vehicles and private automobile users. The relative priority of each of these modes will vary depending on the local context. Guidelines for supporting a range of mobility options can be found in Section 2.2. (R) (M) (D)



Layout of road networks should be coordinated between subdivisions and neighbourhoods to eliminate backtracking or jogs and provide as direct a route as possible for transit vehicles.

Recommended Resources

Geometric Design Standards for Ontario Highways (Ontario Ministry of Transportation)

Geometric Design Guide for Canadian Roads (Transportation Association of Canada)

Ontario Traffic Manual (Ontario Ministry of Transportation)

Transit Network Design and Planning

1.2.2 Planning for an effective *transit* network at a regional scale should be coordinated alongside existing and planned land use patterns. A balance needs to be struck in accommodating movement between established destinations and fostering desired transportation patterns related to planned or emergent *corridors*, *nodes* and new communities.

Transit network design and planning is about effectively linking people to destinations. The design and planning of the transit network on a regional scale will vary depending on the characteristics of the area. Winding, discontinuous road networks and dispersed land use patterns that inhibit the efficiency of the system can make planning transit networks challenging. While it may not always be possible to provide direct routes, people are more likely to use transit if the network is easy to understand and provides direct, quick access from where they are to where they want to go.

In some communities, many destinations may be concentrated in one or a few locations such as a downtown, which results in routes operating in a radial pattern, effectively serving many people. Other communities may have a number of centres of activity or people moving cross-town to and from various points. In this circumstance, routing may be organized in a grid pattern. Planning of transit systems at the regional scale needs to be grounded in a strong understanding of existing and planned patterns of mobility and land use.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

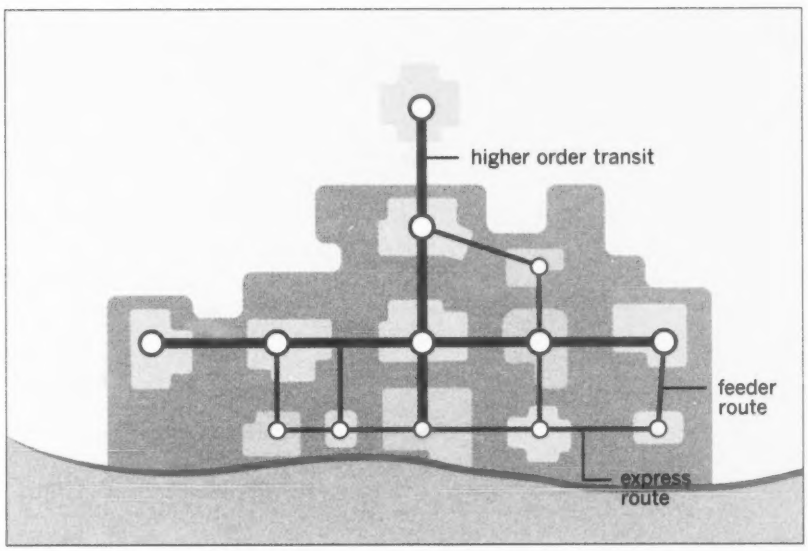
Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional



Transit routes should provide direct links between nodes and seek to harmonize patterns of land use and mobility so that areas with a higher intensity of uses receive higher levels of transit service.

Strategies:

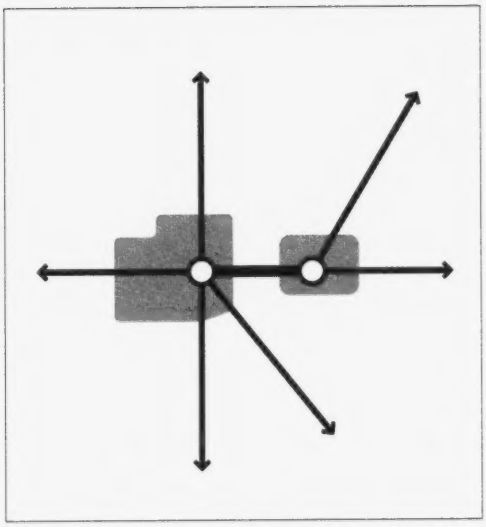
1. Assess existing and proposed land use patterns and plan transit systems to harmonize those patterns with the provision of service so that areas with a higher intensity and mix of uses, such as nodes and corridors, receive higher levels of transit service and are made accessible to other areas within the region or municipality. (R) (M)
2. A comprehensive transit network should develop a family of services that cater to different patterns of land use and commuting needs. This could include a range of route configurations, different levels of service between routes, variations in transit mode and vehicular sizes.
3. Coordinate the location of transit routes and activity nodes between municipal and regional planning agencies and transit service providers to ensure that land use patterns and levels of transit service are supportive of each other. (R) (M)
4. In larger urban areas, provide direct transit routes between different nodes in order to balance the number of riders travelling in each direction and expand the range of activities accessible along a transit route. (R) (M)
5. Transit network design and planning should include provision of transit to new subdivisions (Guideline 1.2.4) early in their development to promote transit use and provide an alternative to the automobile. (R) (M) (D)
6. Plan regional-scale transit networks with a frequency of stations or stops that is appropriate to the context. For example, within nodes or corridors, stops should be more frequent than in lower-density contexts. (R) (M)
7. The design of transit networks should take advantage of available *rights-of-way* such as rail or utility corridors (Guideline 2.6.6), but also consider whether these rights-of-way provide effective alignments to connect people to destinations. (R) (M)
8. To maximize access and convenience for transit riders, transit routes should penetrate into the interior of the areas they are serving. Transfer points between transit routes should be concentrated near the centre of nodes. Rapid transit or commuter rail stations should also be located near the centre of nodes and be designed to facilitate *intensification* over time (Guideline 2.4.3). (R) (M) (D)

Route Types

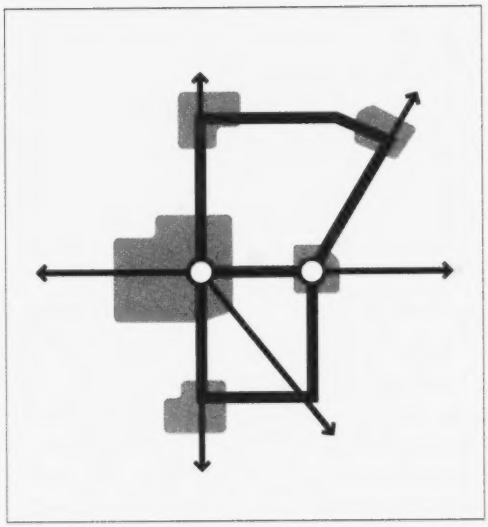
Transit agencies have a range of route types (Guideline 3.1.1) which they can consider when tailoring a transit network to meet the needs of their communities.

Examples of route types include:

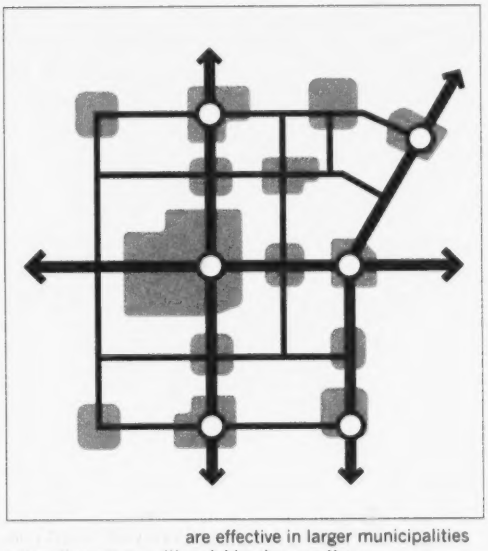
- Direct *line-haul* routes, which can be used in areas of high demand, such as along arterials or corridors. These should be as direct as possible and should be less than 60 minutes in one-way travel leading into downtown or a major activity centre.
- Circulators, which follow circuitous routes but can provide maximum coverage over a wide area, reducing demand for *specialized transit*. Generally, circulator routes should be short so that total one-way travel is less than 30 minutes. They can provide connections to regional transit services and be used to capture unique uses or destinations outside of higher-frequency service areas.
- *Feeder routes*, which can help to supplement *higher order transit* corridors by connecting people to the corridor from dispersed places of origin.
- Express routes, which can serve suburban residential areas where there are sufficient riders travelling to central business districts or large employment centres. Form of line-haul route with limited number of stops at major activity centres that can provide high-speed travel attracting regular ridership.



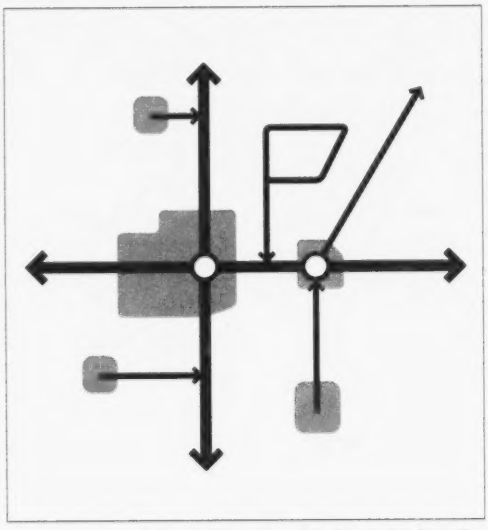
are most efficient where there is a concentration of activity in one node such as a downtown.



can be added as communities grow to enable efficient cross-town service and better serve emerging nodes.



are effective in larger municipalities where there is a multi-nodal land use pattern



can be used to support higher order transit corridors and provide transit service to lower-density dispersed areas within the municipality.

9. Align and design transit routes to minimize the number of transfers required and facilitate transfers between systems. (R) (M) (D)
10. Periodically review transit networks to assess their efficiency and effectiveness at serving transit users as well as their ability to serve and influence changing patterns of land use. Further information on planning performance and monitoring can be found in Section 3.2 of this document. (R) (M)
11. Where multiple routes converge at a specific point within the system they should be designated as transit hubs and planned to facilitate a greater number of transfers between systems. This can be accomplished in a number of ways including through the design of the station areas (Guideline 2.3.5), coordination of scheduling (Guideline 3.1.2) and techniques to enhance trip planning and navigation (Section 3.3). (R) (M)
12. Coordinate planning for transit hubs alongside planning for *nodes* to ensure that hubs are located at concentrations of *transit-supportive* uses and density. This will help to connect riders to a wider range of uses and support increased transit ridership. (R) (M)
13. Locate transit hubs at points where they can connect dispersed concentrations of population, employment and activities, while taking into consideration other concerns such as vulnerability to natural hazards and accessibility at times of emergency (Guideline 2.6.1). (R) (M)
14. Radial transit network design should be considered for communities or regions where activity is concentrated in one major node, such as a downtown. In a radial network, most transit routes converge on the downtown core. (R) (M)
15. As communities with radial transit networks grow, a supporting network of cross-town routes should be considered to facilitate non-downtown transit trips. (R) (M)
16. Grid transit network design should be considered for communities or regions where there is a dispersal of activity or a multi-nodal land use pattern. This *grid network* in many cases will be oriented on *arterial* and *collector* road networks (Guideline 1.2.1). (R) (M)

York Region Transit Family of Services

York Region Transit has implemented a family of services to meet a range of community and travel needs in the region. It includes *bus rapid transit* with frequent and limited stops using distinct vehicles, off-board payment and queue jumps that are integrated with local transit on its busiest corridor. Base services (7 days per week service) are provided on all major east-west and north-south arterials forming a grid network. Local routes serve as feeder or neighbourhood circulation that supports the base grid. Service is further supplemented by express routes that carry passengers between two distinct points such as the subway and a major employer. Shuttles provide local service to GO stations. Accessible dial-a-ride community buses serve seniors and people with disabilities who can use fully accessible conventional transit.

Transit Service Guidelines (York Region Transit)

Recommended Resources

Case Study: Transit Network Design

Case Study: Creating a Transit-Supportive Community Structure

Guidelines for Enhancing Suburban Mobility Using Public Transportation (Transportation Research Board)

Public transport network planning: a guide to best practice in New Zealand cities (Transportation Research Board)

Best Practices in Transit Service Planning (Florida Department of Transportation)

Regional Mobility Corridors

1.2.3 Regional mobility *corridors* should be identified and coordinated between jurisdictions in order to facilitate a greater range of transportation choices between regions and throughout the province.

Identifying a network of regional mobility corridors, routes used to connect regions across a range of modes, enables planners to optimize the movement of people and goods between regional destinations. When regional mobility is not planned for, alternative options for moving between *settlement areas* and regions can be overlooked and in many cases can restrict regional travel to the automobile. This reduces the potential of *transit*, restricting its use to primarily local destinations.

Planning for regional mobility corridors also enables planners to evaluate how easily transfers can be made between local transit networks and can highlight gaps and deficiencies that may need to be addressed at both a regional and local level. The intent is to enable people to travel between regional destinations using a full range of transportation options including walking, cycling, municipal and regional transit and private automobiles. Coordination is important to ensure that corridors are aligned between jurisdictions and that municipal or local transportation strategies are oriented to support the function of regional transportation systems and the movement of people and goods between, as well as within, local jurisdictions.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

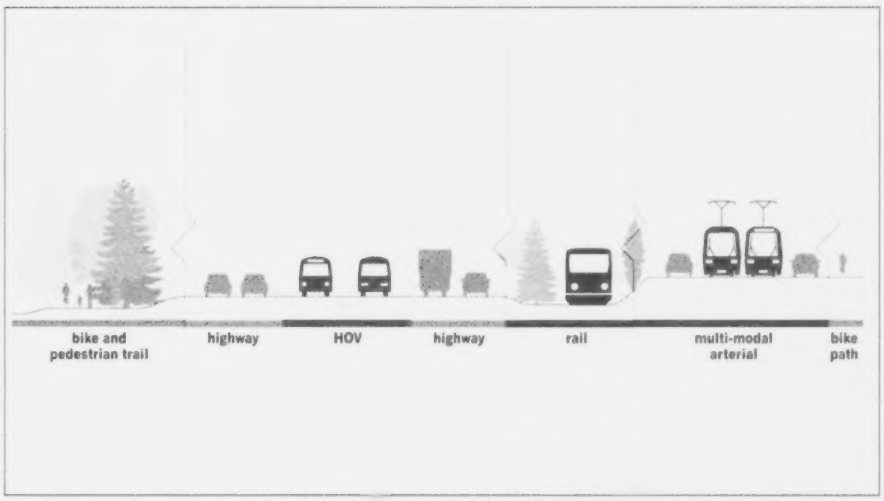
Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional



A regional mobility corridor can be established to coordinate parallel movement systems between regions and municipalities, enabling planners to optimize the movement of people and goods between regional destinations across a range of modes.

Strategies:

1. Coordinate planning for regional mobility corridors between regional jurisdictions and municipalities in order to facilitate the creation of a seamless regional mobility network. In some cases planning for a regional mobility corridor may also involve provincial, federal and/or private transportation facilities and services. It is important to consult with all parties in order to ensure appropriate coordination between modes and across jurisdictions. (R)
2. Plan regional mobility corridors to connect with key regional destinations in order to increase ridership and reduce the need for transfers between regional and municipal transit systems. (R)
3. Consider all modes of transportation in the planning and allocation of space within a corridor, including walking, cycling, transit and the private vehicle. (D) (S)
4. Planning of regional mobility corridors should consider existing and planned surrounding land uses when identifying the function of the corridor and the appropriate allocation of space for various modes of transportation. For instance, if a specific regional mobility corridor serves a largely industrial area, goods movement will be a primary consideration. Alternatively, if there are multiple higher-density employment or residential *nodes*, the movement of people by transit and cycling connections within the corridor may take precedence. (R) (M)
5. Integrate consideration of planned regional mobility corridors with municipal transit planning to ensure that local networks and strategies support larger regional transportation systems. (M)
6. Inter-urban transit systems should provide fast and direct travel between urban areas. Stations or stops outside of designated settlement areas should be minimized to discourage development at intermediate locations. (R)

Recommended Resources

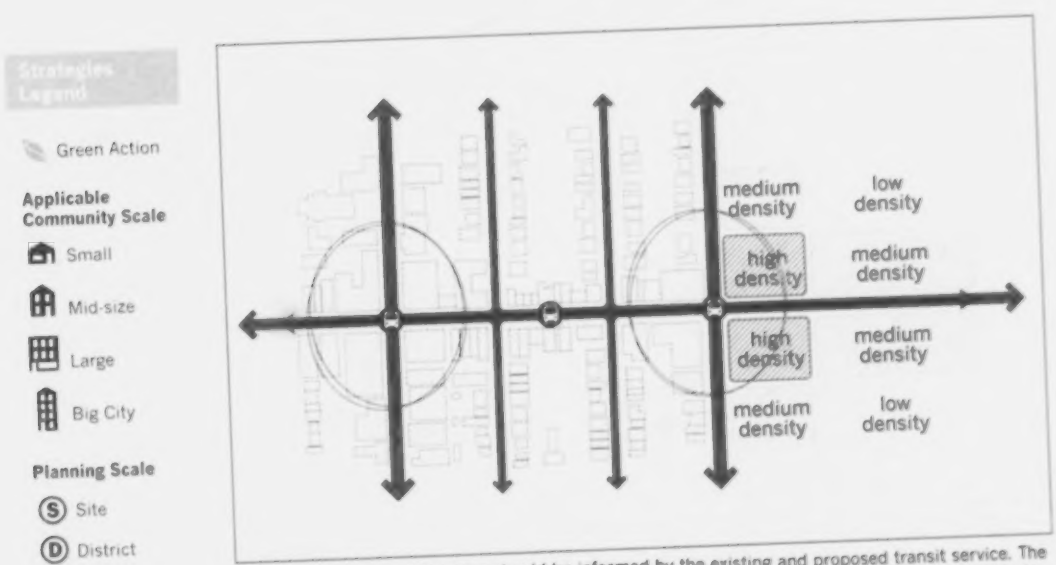
Oregon Regional Transportation Plan (Oregon Department of Transportation)

Bow Corridor Regional Mobility Strategy (Macleod Institute)

Creating and Expanding Transit Service Areas

The expansion of transit service to new communities is an opportunity to increase ridership catchment and expand ridership levels over time. The early provision of transit services to new communities can help to establish more sustainable patterns of movement and help to reduce reliance on the automobile.

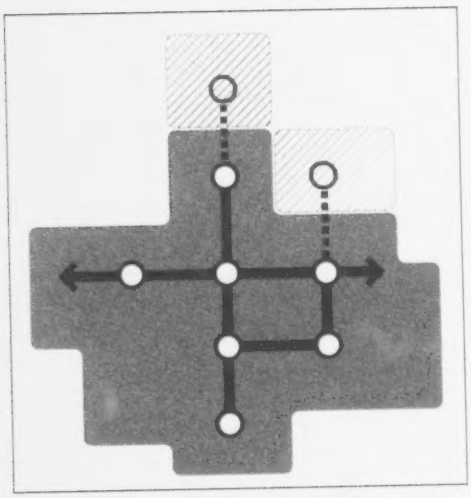
While expanding transit service areas can open up new opportunities for ridership, the decision to provide service to new communities and areas where ridership may be low must be weighed against the cost of providing transit service. Providing transit service in areas that are too costly to serve can negatively affect a system's operating budget and draw resources away from more profitable routes. To minimize the cost of extending transit service areas, it is essential that new development be carefully phased so that it is adjacent to and designed to act as an extension of the existing *built-up area*. This will minimize the distance transit vehicles must travel and will enable the logical extension of existing transit routes.



The design of new subdivisions should be informed by the existing and proposed transit service. The layout and design of streets and open spaces as well as the density and mix of uses should help to support the expansion of existing transit service.

Strategies:

1. Ensure new development is adjacent to and designed to act as an extension of the existing built-up area to minimize the costs of extending transit service. (R) (M) (D)
2. Plan new subdivisions with the provision of transit service as a primary consideration. This should help to inform the layout and design of streets and open spaces (Section 2.1) as well as the density and mix of uses (Guideline 1.1.7). (M) (D)
3. Factor the costs of providing transit services to proposed developments into the evaluation process. Also consider a requirement for developers to fund *transportation demand management* initiatives. A policy to this effect may be adopted by municipal councils as part of the community's official plan. Consider implementing a multi-modal transportation impact assessment process to assess transit costs and requirements related to new development (Chapter 4). (M) (D)
4. In the design phase of new communities, designate roads that will serve as transit routes in order to assist in the structuring of higher-density developments and ensure that they are developed to support transit and transit users from the outset. (M) (D)
5. Build roads designated as transit routes in advance of other roads to enable bus service early in the development process. The front-end costs of achieving this may be justified by less need for subsequent expansion of road capacity, lower land development costs and the reduced energy consumption that results from lower levels of auto-dependency. (M) (D)
6. Introduce transit service as early as possible during the development of new communities, for example at the early stage of occupancy, to encourage early uptake of expanded systems (Guideline 3.1.1). Factors to be considered in the early provision of transit service include the:
   - planned densities and timing of new development within a 5- to 10-minute walk of the proposed service (Guideline 1.1.7). Where densities are lower than sustainable to provide transit service (Guideline 1.1.7), consider partnerships with developers to provide incentives for new riders.
   - distance new routes will need to be extended to serve new areas and impacts this will have on existing service levels.
   - costs of providing additional vehicles to maintain existing levels of service to existing routes. (M) (D)
7. Smaller communities that may not have sufficient population to accommodate regular transit service should consider targeted partnerships, more flexible routes or demand-responsive transit services (Guideline 3.1.1). (R) (M)



Ensuring that new development is adjacent to built-up areas will help to minimize the costs of expanding transit service.

Recommended Resources

Early Transit Phase-In Policy: Promoting Transit in Growing Communities: Brampton, ON (Transport Canada)

Chapter 2

District-Level and Site-Specific Guidelines

Building on an understanding of some of the regional planning considerations, Chapter 2 outlines a range of strategies at both the district and site-specific scale aimed at supporting transit and enhancing transit ridership including:

- **Layout of Local Streets and Open Spaces**
  Enhancing access to transit and creating a more positive user experience (pg 40)
- **Creating Complete Streets**
  Supporting a full range of users including pedestrians, cyclists and transit (pg 44)
- **Enhancing Access to Transit**
  Ensuring that stations and stops are designed to facilitate access and system transfers (pg 58)
- **Creating a Transit-Supportive Urban Form**
  Creating high quality streets and open spaces (pg 72)
- **Parking Management**
  Optimizing parking resources and encouraging a shift away from the single-occupant vehicle (pg 78)
- **Specialized Uses**
  Responding to the unique characteristics of specialized uses (pg 82)

Local Street and Block Pattern

2.1.1 The local street and block pattern should be designed as an interconnected *grid network* aimed at maximizing connectivity for all travel modes and minimizing travel distances to surrounding streets, uses and open spaces.

A key factor in the creation of *transit-supportive* environments is the establishment of a well connected street system capable of accommodating diverse transportation modes including walking, cycling, *transit* and the private automobile. Transit users are sensitive to the distance they must walk or ride their bike to reach a transit stop or station, and long, circuitous routes will discourage travel to and from transit services even if the quality and frequency of transit service is good. While *mid-block walkways* can sometimes help compensate for a disconnected street network, these must be designed for safe, year-round use with appropriate lighting and maintenance to ensure that they are appealing to a range of users.

Streets in transit-supportive places bring together and balance a wide range of users, from *pedestrians* and cyclists to private vehicle drivers, in a setting that is highly visible and connected to the uses around them. Establishing a grid pattern of streets and blocks with a high *street intersection density* that maximizes connectivity and links with both the existing and proposed networks of streets will create multiple options for moving between destinations. This can provide more direct connections with transit services along arterial and collector streets and minimize travel times for pedestrians and cyclists.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

Planning Scale

(S) Site

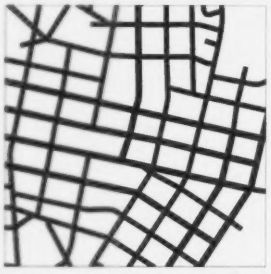
(D) District

(M) Municipal

(R) Regional

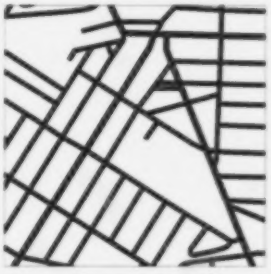
Downtown Belleville ON - 0.47 iph

Cornell: Markham ON - 0.91 iph

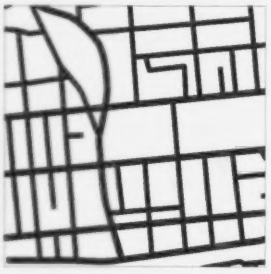


Downtown Kingston ON - 0.79 iph

St Lawrence: Toronto ON - 0.88 iph



Downtown Stratford ON - 0.63 iph



Downtown Thunder Bay ON - 0.58 iph

Walkable neighbourhoods typically have a higher number of intersections per hectare (iph). Achieving an intersection density of 0.6 iph or higher in nodes and corridors will help create multiple options for moving between destinations, enhancing connections between transit services and nearby uses.

Strategies:

layout

1. Establish an interconnected network of streets in new developments and retrofit existing areas (Guideline 1.1.4) to maximize routing options between destinations. (M) (D) (S)
2. Extend new streets and block connections across property lines and design networks to link with existing and proposed streets within the community. (D) (S)
3. Design or retrofit street networks so that a significant majority of residents or jobs (e.g. 90%) are located within a 400 m (approximately 5 minutes) or less walk from a transit stop. (D) (S)
4. Achieve a street intersection density of greater than 0.3 intersections per hectare (iph), with higher street intersection densities of over 0.6 intersections per hectare in *mixed-use nodes* and *corridors*. (D) (S)

physical design

5. Minimize block lengths to promote greater connectivity and enhance the walkability of neighbourhoods. Generally, residential blocks should be less than 250 m along their longest side, with maximum block lengths of 120 m in mixed-use activity nodes and corridors. (D) (S)
6. Design local streets to minimize the need for backtracking and provide direct pedestrian access to primary streets, transit stops and stations where possible. (D) (S)
7. Avoid the creation of dead-end streets or cul-de-sacs to maximize street connectivity. (D) (S)
8. Avoid the creation of *lay-by lanes* which result in increased street widths and decreased pedestrian space within the sidewalk and boulevard area of the street. While generally not desired, there may be circumstances such as at elementary schools or daycares where high numbers of drop-offs and legitimate passenger safety concerns may require the use of lay-by lanes to facilitate passenger drop-off and pick up. (D) (S)

pedestrian access

9. Avoid the use of *window streets*, which double up road *infrastructure* and pull uses away from the street. Where limited access is required, buildings facing onto streets should be accessed via a rear drive or lane. (R) (M) (D) (S)
10. Where it is not possible for the layout of streets and blocks to achieve the walking distance criteria, a *mid-block connection* or pedestrian pathway can be used to minimize walking distances. These should be:
    - constructed of durable, non-slip materials;
    - direct, visible from adjacent uses and illuminated at night to enhance personal safety; and
    - maintained year-round and cleared of snow and ice during winter months. (D) (S)

Street Intersection Density

One measure of a local street and block network is its street intersection density. The street intersection density considers the number of intersections within a given area and is a useful way of comparing the walkability of one area against another. Generally, the higher the street intersection density the greater potential the area has to become a walkable environment.

Travel and the Built Environment: A Meta-Analysis (Ewing and Cervero)

A rear access lane permits this housing in Markham to face onto a limited access arterial road.

Recommended Resources

Case Study: Station Intensification

Urban Design Compendium, Volume 1 (English Partnerships and the Housing Corporation)

Open Space Networks

2.1.2 Planning for new and existing *open space networks* should be coordinated with existing and planned transit systems to strengthen connections to and from transit services and enhance the experience of transit users.

Open space networks are linked parks, plazas, natural areas, and bicycle/walking trails. The layout and design of a community's open spaces can help to support transit use by enhancing connections between the community and its *transit* network, integrating stations into their surroundings and improving the experience for transit users. Plazas, parks, and trails help to make higher-density, *transit-supportive* environments more attractive and liveable. When provided in conjunction with higher-density, *mixed-use development* along a route or *corridor*, open space systems can be important generators of activity, encouraging people to take transit rather than drive to reach recreational activities.

From a commuting perspective, the creation and/or coordination of a comprehensive park and open space network that is linked to transit stops and station areas is an important opportunity to strengthen connections between a community and its transit system. Linking a transit system to a network of parks and open spaces can provide access for users to off-street pedestrian and cycling trail systems, extending the reach of station catchment areas. At the scale of the station, the introduction of new plazas or other open spaces represents an opportunity to strengthen the identity of the station and surrounding area as a neighbourhood and community hub, enhance local connectivity and provide a place for amenities such as seating, public art or cycling facilities.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

Planning Scale

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(D) District

(M) Municipal

(R) Regional

Where planned investments in transit result in a grade-separated *rights-of-way*, the creation of a transit-side trail system is an excellent way to enhance connections for pedestrians and cyclists leading to and from stations. The MetroBikeLink in St Clair County, Illinois (above), connects urban and regional open spaces along the MetroLink transit line.

Strategies:

layout 1. Extend existing park and open space networks, where possible, to link with transit stops and station areas. (R) (M) (D) (S)

2. Where planned transit investments occur off-street, along green corridors or in utility rights-of-way, explore the potential for the transit corridors to act as an extension of the community's open space network. Strategies could include:
   - the creation of a transit-side *multi-use trail* connecting with existing trails and open spaces along the route; and
   - landscaping the transit corridor to create a planted greenway that results in a more positive experience for users and enhances the image of the system. (M) (D) (S)

3. Pursue opportunities to co-locate destination open spaces and transit networks to enable access to these areas by transit, while taking into consideration compatibility and safety measures where appropriate. (M) (D) (S)

transit plazas 4. Explore the creation of a station-related open space at regional destinations or at stations along rapid transit corridors to:
   - enhance connections between a surrounding neighbourhood and the station area;
   - provide a quality location through design and use of high-quality materials for user amenities such as wayfinding, public art and/or seating and support ancillary uses such as coffee shops and convenience stores;
   - provide a location for cycling-supportive facilities such as racks, lockers and drinking fountains; and
   - strengthen the identity of the station and surrounding area as a destination and community hub. (D) (S)

planning strategies 5. Coordinate the planning of new parks and open spaces alongside the planning of new transit systems and/or facilities to maximize mutual benefit. M (D)

6. Include information on local open spaces and amenities such as recreational facilities in transit websites and other resources, and provide transit links on websites to help residents plan their outings without having to take their cars. R M

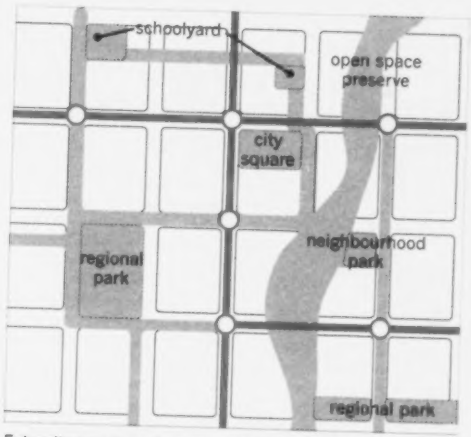
7. The design of large destination open spaces should support public transit by locating amenities such as washrooms and restaurants where they are easily accessible to transit users. Higher traffic generating uses should be located in closer proximity to transit services. R M

8. Account for seasonal variations in open space usage and special events in service scheduling so that there is a higher level of service during peak periods or seasons. M

San Francisco: Transit and Trails

The Transit and Trails program run by the Bay Area's Open Space Council connects transit users with local open space networks. A unique web-based trip planner helps users plan their outings by enabling them to search for parks or trails and identifying how to get there on public transit. Users can search trailheads and preset trips and share trip experiences online.

Transit and Trails Program (Bay Area Open Space Council)



Extending park and open space networks to connect with station areas can help to extend station catchment areas by strengthening connections between surrounding neighbourhoods and the transit system. Networks can be extended over time through targeted streetscape improvements, the extension of pathways through existing public easements or through the development approvals process in negotiation with area developers.

Recommended Resources

Urban Design Compendium Volume 1 (English Partnerships and the Housing Corporation)

Complete Streets Planning Process

2.2.1 The design of streets should involve a comprehensive planning process, one that identifies the needs and balances the requirements of the full range of potential users within a community including users of all ages and abilities, *pedestrians*, cyclists, *transit* vehicles and motorists.

A *transit-supportive* environment enhances mobility not just for transit riders but for the full range of users within the catchment area of the transit system. Planning for *complete streets* is an important part of creating more transit-supportive environments. They help to enhance access to transit, facilitate the operation of transit vehicles and enhance connections for transit users between end stops, stations and local destinations. This is particularly relevant for those who may be unable to drive but still need to travel within and across their communities. By investing in complete streets, municipalities can support their transit system while enabling greater independence for the elderly and influencing future travel patterns of younger residents.

Establishing a network of streets that balance the needs of a full range of potential users requires consideration of users of all ages and abilities, pedestrians, cyclists, transit vehicles and motorists. In addition, the needs of nearby residents, businesses and other uses located nearby must also be considered. This necessitates a comprehensive process to consult with users, identifying their needs and respective design requirements along a street, adjusting standards where necessary and balancing design trade-offs where they exist. Not all streets will be the same and decisions regarding design features should reflect local user characteristics as well as long-term objectives for the street and surrounding areas.

Strategies Legend

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Mid-size

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User perspectives on design elements for safe pedestrian crossings

	Pedestrians	Cyclists	Motorists	Transit	Adjacent Uses
Mid-Block Crossings	●	●	X	●	✓
Refuge Islands	✓	●	●	●	●
Medians	●	●	✓	✓	●
Curb Extensions	✓	●	●	●	✓
Pedestrian Countdowns	✓	–	●	–	–
Small *Curb Radii*	✓	–	●	X	●

✓ Positive Impact X Negative Impact ● Use with Caution – Neutral

The City of Charlotte's Urban Street Design Guidelines identify a matrix of design elements and the impacts of each element on various users. While it is not a comprehensive consideration of all aspects of street design and the tradeoffs between elements, it assists design teams in considering a range of options when they face design issues in constrained environments (Case Study 03).

Strategies:

process strategies

1. Identify and develop a range of design elements and features aimed at facilitating movement by different users. These should promote a shift in travel behaviour based on the following passenger transportation hierarchy:
   - Trip avoidance or shortening, for example by encouraging a mix of uses
   - *Active transportation* such as walking or cycling
   - Transit
   - Ride-sharing, for example by carpool or *vanpool*
   - Carsharing and taxis
   - Single-occupant vehicles (R) (M)
2. Review existing street standards, such as speed limits and lane widths, to assess their impacts on all users, including children and the elderly, and revise them to reflect a more balanced user profile. Consider setting aside a set percentage of the *rights-of-way* for active transportation and public space. (R) (M)
3. Work with local stakeholders to identify level of service criteria for all modes of transportation including walking and cycling. (M)
4. Identify and document the benefits and trade-offs of different design approaches in relation to the impacts on various users to assist in decision making. This should include an evaluation of the level of service impacts on all modes. (R) (M)
5. Review existing street planning processes and revise as necessary to integrate routine consideration of a full range of users. Codify circumstances where exceptions to the provision of design features intended to support different users are made, demonstrating how conflicts between users will be resolved. (M)

design strategies

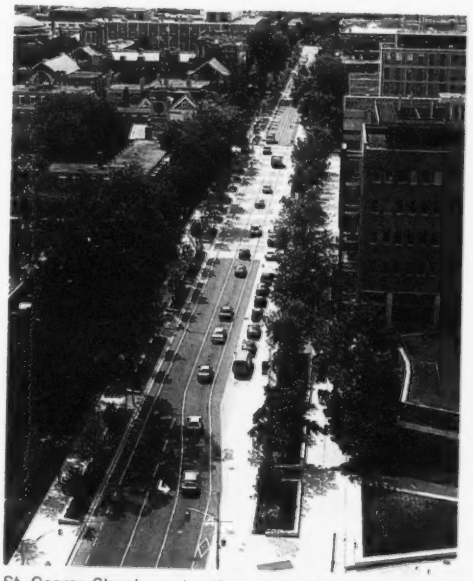
6. Design complete streets to reflect both the existing and planned land use, urban form and transportation contexts. Not all streets will be the same. Trade-offs between features should reflect the long-term objectives for the street and surrounding areas. Goods movement needs within the municipality, including both designated routes and access for local deliveries, should be considered along with passenger transportation needs where appropriate. (M) (D)

evaluation

7. Regularly evaluate design elements and street treatments implemented against performance standards related to factors such as safety, comfort or ease of use to ensure the achievement of complete streets. (R) (M)

planning strategies

8. Embed complete street planning policies within official plans and establish a planning process that ensures all users are considered in the design, refurbishment or reconstruction of existing and planned streets (Chapter 4). Coordinate street improvements between various city departments to expand the network of complete streets over time. (R) (M)



St. George Street running through the heart of the University of Toronto campus was rebalanced in 1997 through the addition of bike lanes and pedestrian-supportive paving treatments to create a street that better supports the many pedestrians and cyclists that use it daily.

Recommended Resources

Case Study: Creating Complete Streets

National Complete Streets Coalition

Complete Streets: Best Policy and Implementation Practices (McCann and Rynne)

Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (Institute of Transport Engineers)

Child and Youth Friendly Land-use and Transport Planning Guidelines for Ontario, Version 2 (The Centre for Sustainable Transportation)

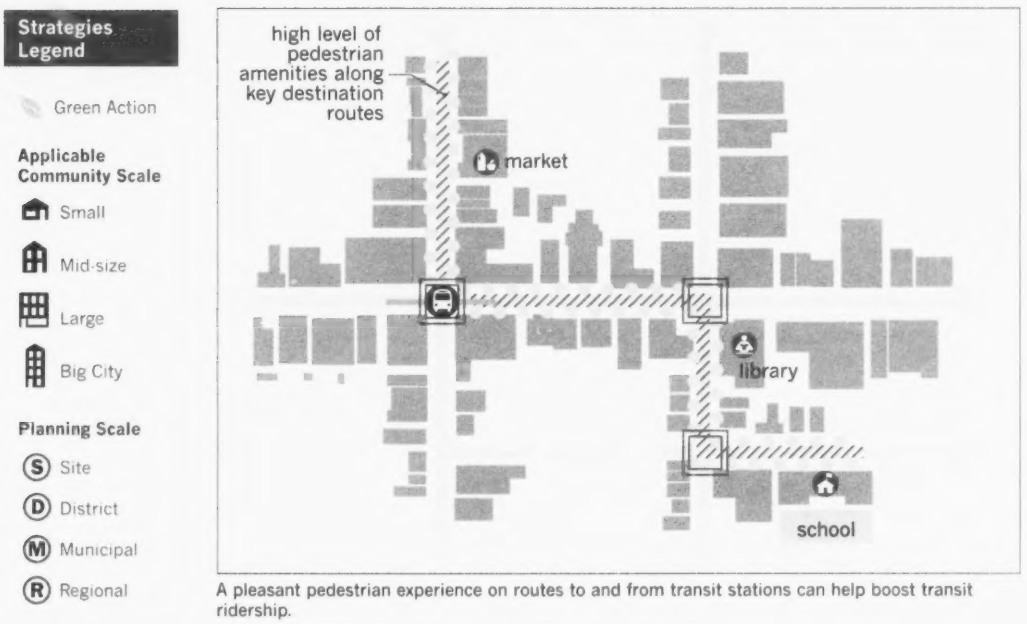
Urban Street Design Guidelines (Charlotte Department of Transportation)

Supporting Pedestrians

2.2.2 Streets should be designed with sidewalks and crossings that are comfortable to use, with frequent intersections and crossing points that provide multiple routing options and amenities that enhance the experience of walking to and from *transit*.

Traditionally, transit planning has focussed on how to most efficiently get people from point A to point B, but has not typically considered the quality of the experience at either end. As transit systems move towards attracting more commuters who take transit by choice, it will be increasingly important to factor in the *pedestrian* experience as part of a more holistic transit ridership strategy.

Pedestrians are all people on foot or moving at walking speed, including those who use mobility aids (wheelchairs, scooters etc.), those with strollers and buggies, and people with limited mobility. The majority of transit users are pedestrians at both ends of their trip, and therefore the ability to walk to and from a transit stop or station is an important consideration for any transit system. The establishment of a strong network of pedestrian-supportive streets within walking distance of public transit is fundamental for enhancing system access for transit users. Areas that have limited or poor pedestrian accommodations such as wide roadways with limited crossings, intersections that prioritize vehicular movement and sidewalks that are uncomfortable for users during hot summer and cold winter months can be barriers to pedestrians and discourage walking to and from the transit stop or station.



A pleasant pedestrian experience on routes to and from transit stations can help boost transit ridership.

Strategies:

connections 1. Provide sidewalks on both sides of all streets within a 400 m radius from transit stops and an 800 m radius from express stops or rapid transit stations. Evaluate pedestrian capacity on sidewalks with significant volumes using level of service metrics. Measures can be used to determine when to make improvements or reallocate space from other uses. (M) (D) (S)

sidewalks 2. Provide a broad *pedestrian through zone* with a suggested width of 1.8m or more to comfortably accommodate two people walking side by side on all principal pedestrian routes in *nodes* and *corridors* (see illustration, p. 48). Where feasible, locate the pedestrian through zone beyond the "splash zone" and incorporate an additional furnishing zone to accommodate bus shelters, waiting areas, landscaping and the potential for retail or commercial *spill-out space*. Appropriate widths and other features will vary, and should be determined in consultation with relevant geometric standards and guidelines. (D) (S)

3. Provide a broader pedestrian through zone, with a suggested width of 2.4m or more, in areas with high volumes of pedestrian traffic, such as *pedestrian districts*. (D) (S)

4. Work with community representatives, including youth, the elderly and persons with disabilities, to identify key destinations and target sidewalk provision and other enhancements to better connect those areas. (M) (D)

rural settlements 5. In small towns or rural *settlement areas* where the provision of sidewalks may not be feasible, consider providing a paved shoulder linking major destinations in and around stop/station area. Appropriate widths and other features will vary, and should be determined in consultation with relevant geometric standards and guidelines. (M) (D) (S)

amenities 6. Provide a range of pedestrian amenities (Guideline 3.4.3) to enhance pedestrian comfort and safety, including:

- trees to provide shade during hot summer months and contribute to an attractive pedestrian environment;
- furnishings such as benches and waste bins; and
- attractive *pedestrian-oriented lighting*. (M) (D) (S)

7. Coordinate the provision of pedestrian amenities with patterns of usage, concentrating amenities along key streets leading to and from stop or station areas or between key destinations. (D)

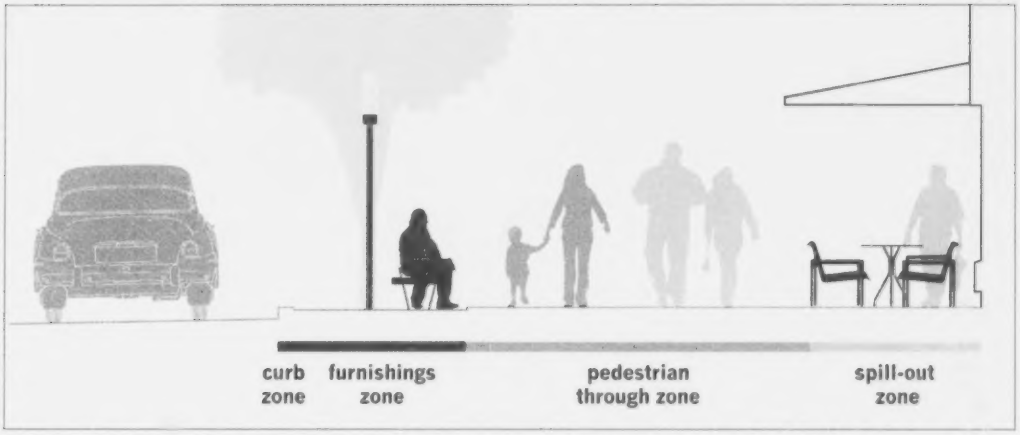
8. Street-related buildings can contribute to pedestrian amenity through the provision of canopies or elements designed to mitigate the impacts of wind or weather conditions. (S)

9. Incorporate curb cuts at all pedestrian crossings to assist people with strollers, carts or mobility issues. (S)

Trees, human-scaled lighting and seating create a pleasant pedestrian environment.

Street-related buildings can contribute to pedestrian comfort through the provision of canopies that can mitigate against the impacts of wind or weather.

Special surface treatments such as along this street in Brighton alert drivers to pedestrian priority.



Sidewalks on principal pedestrian routes within nodes and corridors should provide for broad pedestrian through zones, particularly in pedestrian districts. An additional furnishing zone to accommodate bus shelters and waiting areas, street trees, planters and the potential for retail or commercial spill-out space may also be required.

In older downtowns and main street settings, constrained rights-of-way may make it difficult to implement pedestrian improvements. When this occurs, trade-offs should be considered such as reduced lane widths which can expand the pedestrian through zone or small building setbacks at key intersections and station areas that can help to provide more generous pedestrian areas over time.

10. Establish a regular maintenance schedule and prioritize snow removal in winter months along high traffic routes and key streets leading to and from transit stops or station areas. (M)

11. Design all streets with frequent opportunities for safe crossing at a signalized intersection, stop sign or activated crossing. (D)

intersections

12. Design intersections to balance the needs of pedestrians and vehicles by:

- avoiding using right-turn channels and turning lanes that enable higher vehicle speeds and increase crossing points;
- maintaining the minimum *curb radii* required to accommodate turning vehicles, in order to reduce their speed and minimize crossing distances for pedestrians;
- providing pedestrian refuge points when crossings exceed 15m in length; and
- incorporating unique pavement treatments or markings that can alert drivers and indicate pedestrian priority. (D) (S)

13. At signalized intersections with high pedestrian traffic, consider the use of a pedestrian priority phase to enable simultaneous pedestrian crossings in all directions. (S)

14. Ensure intersections are clear of unnecessary obstructions and provide clear sight-lines to adjacent streets so that pedestrians can spot approaching vehicles. (D) (S)

pedestrian pathways

15. Pedestrian pathways can be used to shorten walking distances between destinations or provide access through natural areas, *infrastructure* easements or open spaces. Where possible, paths should be wide enough, with a suggested width of 1.8 m or more, to allow persons with strollers, wheelchair users and others to pass while remaining on the pathway. (M) (D) (S)

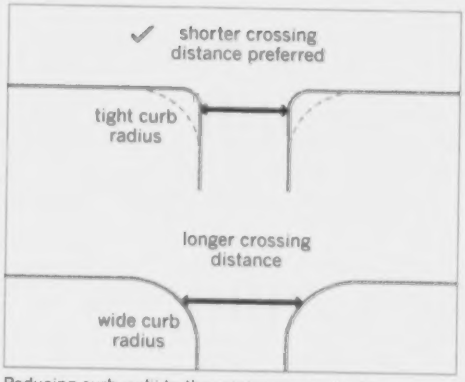
16. *Multi-use trails* intended to accommodate both pedestrians and cyclists need to be wide enough and have clear sightlines to accommodate users moving at different speeds, and should be clearly marked. Recommended widths and other design features are provided in the Ontario Bikeways Planning and Design Guidelines. (M) (D)

bridges and overpasses

17. Design bridges and overpasses to accommodate all users, for example by providing a sidewalk on either side of the structure. Appropriate widths and other features should be determined in consultation with relevant geometric standards and guidelines. (S)

18. Design bridges to enable pedestrians to see from one end to the other for safety. Integrate ramps into the structure and provide direct connections to adjacent sidewalks. (S)

19. On busy overpasses, the provision of planted or structural buffers between the sidewalk and street can help to enhance the sense of safety for pedestrians. (S)



Reducing curb radii to the minimum required to accommodate turning vehicles can help to reduce crossing distances for pedestrians.

Recommended Resources

Pedestrian- and Transit-Friendly Design: A Primer for Smart Growth (Ewing)

Pedestrian Design Guidelines (City of Portland)

World Class Streets: Remaking New York's Public Realm (New York City Department of Transportation)

Planning and Design for Pedestrians and Cyclists (Vélo Québec)

Ontario Bikeways Planning and Design Guidelines (Ontario Ministry of Transportation)

Canadian Highway Bridge Design Code (Canadian Standards Association)

Geometric design guide for Canadian roads (Transportation Association of Canada)

Geometric design standards for Ontario highways (Ontario Ministry of Transportation)

Walk and Roll Peel (Peel Region)

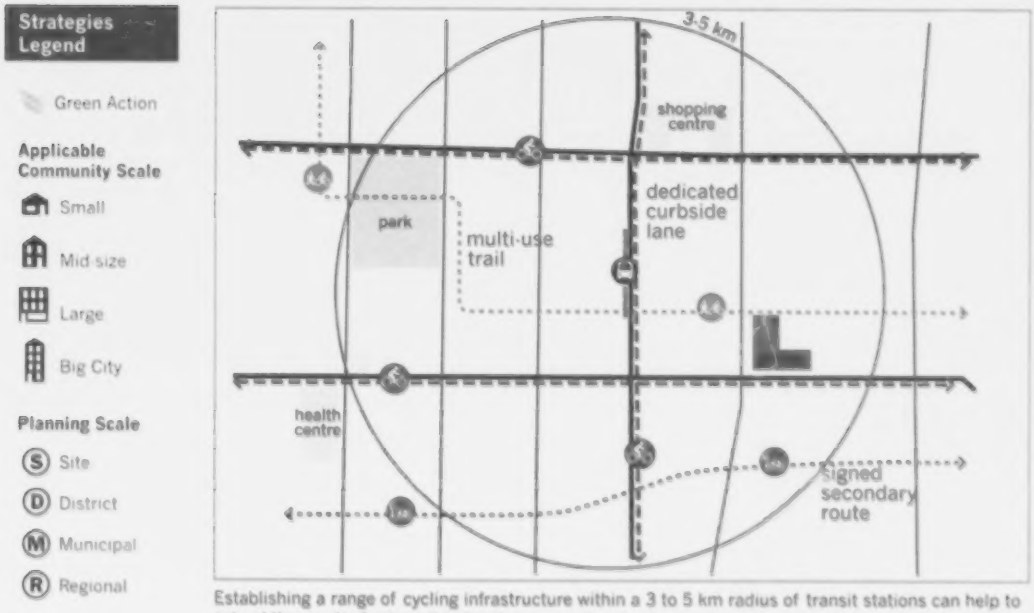
Walk 21

Supporting Cyclists

2.2.3 The design of streets should help support the establishment of an extensive cycling network, creating safe and convenient streets for cyclists that are linked with *transit*, minimize conflicts between cyclists and other modes of transportation and contain amenities to support cycling.

While transit is best suited for medium- to long-distance commutes, cycling as a mode of transportation can be very effective for shorter trips and can accommodate multiple stops in between. The combination of cycling and transit creates an opportunity for commuters to cover longer distances while allowing them to conveniently reach destinations that may be up to 5 km from a stop or station. This can greatly extend the reach of a transit system, providing a level of service that is comparable to that of the private automobile.

Streets that have been designed solely for motorized vehicles can be intimidating for cyclists, placing them in conflict with other vehicles and *pedestrians*. The creation of a network of cycling-friendly streets and supportive *infrastructure* leading to and from transit will help to support and encourage users who otherwise may find it difficult to reach transit, or conversely may want to cycle from transit to their final destination. This is particularly important in rural and suburban environments where densities are low, destinations are dispersed and vehicular speeds are high.



Establishing a range of cycling infrastructure within a 3 to 5 km radius of transit stations can help to extend the reach of a transit network.

Strategies:

networks 1. Coordinate the identification and layout of bicycle routes with transit planning to enhance connections to transit stops and station areas. (M) (D)

2. Bicycle networks should comprise a range of cycling accommodations (see page 50) that together establish a continuous, interconnected network throughout and between *settlement areas*. Identify routes that are attractive to cyclists, with direct connections between major destinations, slower traffic speeds and volumes and/or limited grade changes. (M)

3. Avoid gaps or jogs in routes and connect existing gaps between routes over time. Using *contraflow* bike lanes on one way streets, indicated by pavement markings and clear signs, can be an effective strategy to connect gaps in the bike network. (M)

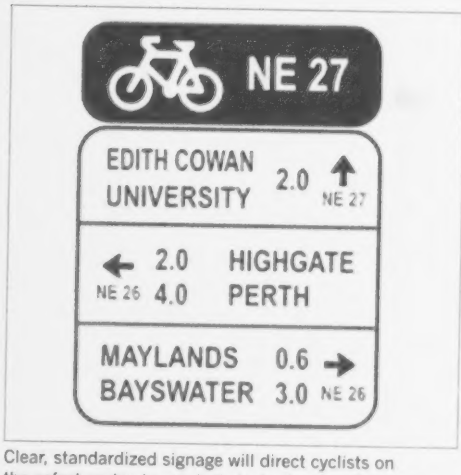
bike ways 4. Establish signed cycling routes leading to and from station areas within a 3 to 5 km radius of rapid or regional transit stations.

- Where possible, these routes should be dedicated curb-side bike lanes or marked, shared curb lanes with sufficient width to accommodate both motor vehicles and cyclists. A wider bike lane should be provided when adjacent to curb side parking to allow cyclists to pass safely when drivers exit their vehicles. Wider lanes may be also necessary depending on the vehicle volumes and levels of truck traffic. Recommended widths are identified within the *Ontario Bikeways Planning and Design Guidelines*.
- Highlighting dedicated bike lanes with a solid colour may help to alert drivers of their existence and enhance user safety. Lanes should be coloured with durable, slip-resistant and reflective material to prevent sliding when wet and improve visibility.
- In rural settlement areas, bike lanes can be created by modifying a paved shoulder to provide a signed bike lane along concession roads leading to and from stops and/or station areas. Appropriate widths and other features of the bike lane will vary with truck and general traffic volumes and speeds. (M)

5. Municipalities should work with local enforcement officials to ensure that parking and stopping restrictions in bike lanes are enforced. (M)

6. In areas where there are high levels of vehicular traffic or speed limits, for example, over 60 km/hr, the provision of *segregated cycling facilities* should be considered. Segregation can be achieved in a number of different ways, using bollards, concrete islands, boulevards with medians or other methods to separate and protect cyclists. When choosing a treatment, considerations should include location of driveways, space for manoeuvring around hazards, ease of maintenance, and the safety of pedestrians. (M) (D)

A dedicated bike crossing in Stockholm enables through cyclists to pass while turning cyclists are provided a place to wait for the appropriate signal.



Clear, standardized signage will direct cyclists on the safest routes to reach their destination. Signage indicating the route number as well as distances and directions to key locations within the network will assist cyclists.

A free bicycle pump at a transit station in Stockholm helps to support cyclists travelling to and from the station area.

There are a range of options for facilitating enhanced bicycle access. Decisions around the appropriate form of cycling accommodation should be based on an understanding of existing and planned land use conditions, traffic levels, rights-of-way restrictions and local ridership characteristics.

Dedicated bike lanes adjacent to sidewalks such as this Stockholm example create a safer environment for cyclists and facilitate plowing during winter months.

Multi-use trails can be used to provide access through natural areas, infrastructure easements or open spaces.

Physically-separated curb-side bike lanes such as this example from Montreal create a safe and secure dedicated environment for cyclists along busy streets.

Painted, curb-side bike lanes such as this example from New York create a highly visible space for cyclists along busy streets.

Where lane widths permit, shared curb lanes can be marked with sharrows (a pavement marking that typically incorporates a bicycle symbol and two chevrons) to indicate a shared vehicular and bicycle traffic lane.

Signed secondary cycling routes along local streets with lower traffic volumes are an excellent way of connecting local neighbourhoods and destinations with more dedicated cycling facilities.

secondary routes

7. Provide *multi-use trails* that are wide enough to accommodate segregated pedestrian and cyclist traffic and extend them to connect with transit facilities. Recommended widths and other design features are provided in the Ontario Bikeways Planning and Design Guidelines. (M) (D)

8. Create signed, secondary cycling routes, sometimes known as 'bicycle boulevards', along lower-volume streets leading to transit stops/stations. Bicycle boulevards are most successful where they offer a comparable alternative to larger roads in terms of travel time. This can be facilitated through measures such as cyclist activated signals at major intersections. (M)

materials & maintenance

9. Construct cycling routes with smooth sturdy paving material such as asphalt or concrete. Establish a regular maintenance schedule, including snow clearance, to ensure that all routes are clear of snow, significant debris or damage year round. (S)

wayfinding

10. Create or utilize a standardized palette of street signage indicating the location of cycling facilities and distances to key destinations to promote safety, wayfinding and *legibility*. (M) (D)

11. Posting cycling directions to and from major destinations within a 3 to 5 km radius of transit stations can raise awareness of cycling to transit for non-cyclists. (R) (M)

12. Post signage along major streets directing cyclists to more bike-friendly routes leading to transit stop or station areas. (R) (M)

13. Include cycling routes, bike locker and station locations on transit maps to direct cyclists to transit facilities and support integrated transit/cycling trips. (R) (M)

intersections

14. The use of *bike boxes* at intersections, where appropriate, may help to alert drivers and minimize conflicts between turning vehicles and cyclists continuing through the intersection. (D) (S)

15. The use of cyclist-activated crossing signals can enhance crossing points for cyclists by reducing *rights-of-way* confusion. (S)

amenities

16. The provision of bike racks, lockers and cycling amenities such as air pumps and drinking fountains at key destinations along a cycling route can help to support travel to and from station areas and facilitate quick convenience stops. This can be implemented through private-sector partnerships and development agreements, *streetscape* improvement programs or during the upgrade of transit facilities. (S)

17. Enhance cyclist safety and prevent falls resulting from bicycle tires catching in grooves or gaps in the route by upgrading railway crossings and using drainage grates with narrow gaps, arranged perpendicular to the curb. (M) (D)

18. Establish minimum bike parking requirements in zoning by-laws that outline requirements for different uses. Establish standards for the amount of bike parking and provision of other amenities which relate to development type, size and/or number of vehicle parking spaces. Generally, retail or commercial uses will require more short-term parking, while office and residential uses will require more secure facilities. (M) (D)

Thunder Bay - Cycling Education

Educating motorists and cyclists on sharing the road and the proper and safe use of bikeways can help promote *complete streets* and support cyclist safety. Thunder Bay produced a brochure on shared and dedicated bike lanes as part of its launch of active transportation routes on the City's streets.

Active Transportation Thunder Bay

The use of bike boxes at intersections, indicated by clear pavement markings, can help to minimize conflicts between turning vehicles and cyclists. Bike boxes should be implemented where no right turns on red are allowed and supported by public education.

Recommended Resources

Case Study: Cycling Facilities

Integrating Bicycling and Public Transport in North America (Pucher and Buehler)

Ontario Bikeways Planning and Design Guidelines (Ontario Ministry of Transportation)

Breaking Barriers to Bicycling: Bicycle Lanes Best Practices and Pilot Treatments (Mid-Ohio Regional Planning Commission)

Planning and Design for Pedestrians and Cyclists (Vélo Québec)

Urban Bikeway Design Guide (National Association of City Transportation Officials)

Fundamentals of Bicycle Boulevard Planning & Design (Initiative for Bicycle & Pedestrian Innovation)

Accommodating Buses in Mixed Traffic

2.2.4 Working within an understanding of the planned local and regional transit network, arterials and collectors should be designed to accommodate *transit* vehicles in a manner that enhances efficiency and ease of use while balancing the needs of *pedestrians*, cyclists and motorized vehicles.

For the majority of regions and municipalities, transit is accommodated on the streets, within a limited *rights-of-way* that is shared by other users. The way in which these streets are designed can have a significant impact on the operation of vehicles, enabling efficient travel, enhancing boarding conditions for passengers, minimizing conflicts with other users and enabling the provision of *higher order transit* in dedicated *corridors* over time.

Given the higher number of users per vehicle, it makes sense to provide both room and priority for transit vehicles within a street. Small streets that aren't designed to accommodate transit and streets that accommodate transit as an afterthought can result in increased travel time, poor user experience and safety issues.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional

A contraflow lane in west London, permits buses to travel along a consistent linear route north and south through the city.

Strategies:

physical design

1. Design designated transit routes to accommodate transit by providing limited grade changes, adequate lane widths and turning radii. Design standards should balance the needs of other users such as pedestrians and cyclists, for example by incorporating minimum turning radii at intersections and adequate space for cyclists within the rights-of-way. (M) (D)

2. Ensure roads being used as bus routes conform to design standards for local *collector roads*, which govern surface and subsurface materials and depths. (S)

3. Avoid one-way street systems that result in looped transit service. These can be confusing and inconvenient for transit users. Where this is an issue, consider the conversion of the street from a one-way to two-way street or the provision of a *contraflow lane*. Contraflow lanes can be effective for express buses with no stops in the contraflow lane, short distances without stops used to connect route gaps, or on roads with traffic islands to accommodate stops. (D) (S)

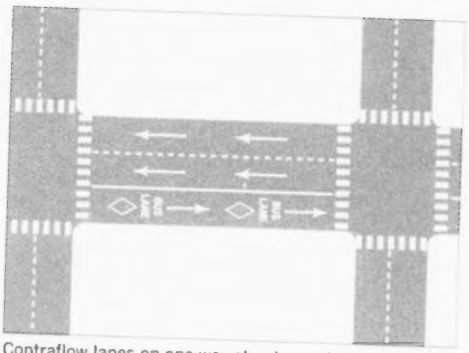
4. The use of bus bays should be carefully considered depending on the circumstances. Bus bays can interfere with cyclists, result in increased street widths, which affects pedestrian crossings, and can make it difficult for buses to re-enter traffic in congested conditions. Installation of bus bays may be appropriate under the following circumstances:

   - Locations that are major trip generators where the bus could be stopped for a significant amount of time to load and unload passengers
   - Locations where there are specific safety and capacity concerns with the bus being stopped in a traffic lane.
   - At large scale arterials considering BRT service.

   Far side stops at intersections are preferred, supported by *queue jump lanes* for transit vehicles and *signal priority* where possible. (S)

safety for cyclists

5. When transit vehicles will be sharing the street with cyclists, provide a curb lane wide enough to allow buses to pass cyclists safely. The appropriate lane width will vary depending on truck and general traffic volumes and speeds. Suggested widths are identified within the *Ontario Bikeways Planning and Design Guidelines*. (S)



Contraflow lanes on one-way streets can help to provide efficient service along transit corridors that is easy to understand for users.

Ontario's Highway Traffic Act requires drivers to yield the right-of-way to buses leaving bus bays to merge with traffic. However, buses can still experience difficulty re-entering traffic from the bus bay when traffic is backed up.

Recommended Resources

Transit-Friendly Streets: Design and Traffic Management Strategies to Support Livable Communities (Transportation Research Board)

Geometric Design Guide for Canadian Roads (Transportation Association of Canada)

Geometric Design Standards for Ontario Highways (Ontario Ministry of Transportation)

Ontario Bikeways Planning and Design Guidelines (Ontario Ministry of Transportation)

Transit Priority Measures

2.2.5 *Transit* priority measures aimed at improving the attractiveness of transit should seek to enhance travel times and reliability without infringing on pedestrians, cyclists and other users of the street.

Transit priority measures aim to improve transit travel times and enable the delivery of a more consistent level of transit service by providing priority to transit vehicles within the street *rights-of-way*. Transit priority is typically achieved through either the provision of exclusive lanes within the street or through a range of design interventions aimed at prioritizing transit operations where conflicts with other vehicles typically occur.

Given the higher number of users per vehicle, it makes sense to provide priority for transit vehicles within a street. The increased speed and reliability that transit priority measures can provide is an important strategy towards growing transit ridership and increasing *modal split*. In keeping with the principle of *complete streets* (Guideline 2.2.1) however, in a limited rights-of-way, these priority measures should be balanced against the potential impacts on users of the street, particularly *pedestrians* and cyclists who may be adversely affected.

Effective transit priority measures can result in a higher transit modal split. Where there is a potential shift of mode choice to transit, regions and municipalities could consider accepting higher volume to capacity ratios on their roadways. For example, where a typical volume to capacity ratio is 0.80 - 0.90, a level of service approaching 1.0 could be considered after implementing transit priority measures.

Strategies Legend

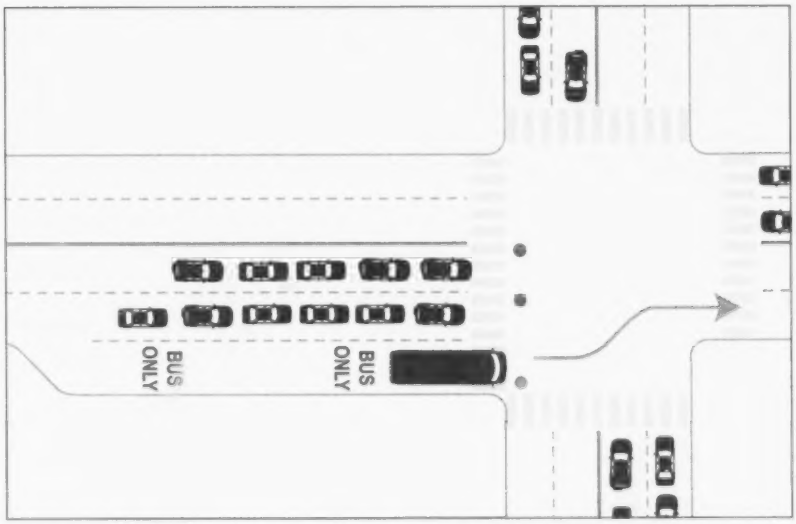
Green Action

Applicable Community Scale

- Small
- Mid-size
- Large
- Big City

Planning Scale

- (S) Site
- (D) District
- (M) Municipal
- (R) Regional



Queue jump lanes with signal priority can speed up transit vehicle flow at congested intersections.

Strategies:

physical design

1. *High occupancy vehicle (HOV)* or reserved transit lanes can enhance the efficiency and reliability of transit in congested urban settings. They can be implemented in a number of ways including:
   - on a paved widened median along a highway;
   - as either full-time or restricted to only peak traffic periods;
   - as a reversible median lane that changes direction according to peak traffic flow;
   - as *reserved bus lanes* or as mixed transit, cycling and multiple occupant vehicle lanes in downtown urban settings; or
   - through special signage and markings in existing curb lanes.

   HOV lane implementation requires careful study to demonstrate sufficient demand, particularly if lane conversion is being considered. (R) (M)
2. Effective enforcement is critical to the success of maintaining HOV and reserved bus lane priority and can be accomplished on a spot check basis or through camera technologies. (M)
3. Reserved bus lanes can provide a higher level of priority and more predictable traffic flow for transit buses than HOV lanes, and accommodate transit stops if located in the right hand lane.
4. Where HOV lanes are intended for use by multiple occupant vehicles and cyclists, provide a curb lane wide enough to allow buses to pass cyclists safely. Suggested widths are identified within the *Ontario Bikeways Planning and Design Guidelines*. (M)

signal priority

5. Adapting and providing priority traffic signals so that they are responsive to transit vehicles can speed up travel times on routes where congestion is anticipated and minimize delays (Guideline 3.1.3). (M)
6. Identify intersections where transit vehicle delays are anticipated. The integration of *queue jump lanes* with *signal priority* at these locations can help to speed up travel times. (M)

street parking

7. In limited rights-of-way where street parking creates friction with bus and cycle use, time-sensitive, restricted parking during peak hours can help to free up the flow of traffic supporting more efficient travel by buses, cyclists and motorized vehicles. (D)
8. Where street parking is provided, *bus-bulbs* can help to facilitate passenger loading and create space for passenger amenities. (D)

dedicated transitways

9. Design dedicated transit ways as integral *streetscape* elements that contribute to the image and character of the street. (D)
10. Encourage the integration of landscaping within dedicated right-of-ways to enhance the character and quality of the street for pedestrians, cyclists and transit users. (D)
11. Make provision for both formalized and informal street crossings along dedicated transit-ways. Restricting crossings in *mixed-use* settings can disrupt local businesses and lead to dangerous situations as people attempt to bypass barriers. (D)

planning strategies

12. When protecting rights-of-way for future arterials, consider the eventuality of incorporating transit/HOV lanes. (R) (M)

Bus-bulbs, such as this example in Portland, speed up boarding times while providing additional space in waiting areas.

Recommended Resources

Case Study: Mid-Sized Community Rapid Transit

Case Study: Growing Transit Ridership

Case Studies in Sustainable Transportation – Transit Priority System: Planning and Pilot Project Deployment: York Region, ON (Transport Canada)

Strategies for Implementing Transit Priority (Federation of Canadian Municipalities and National Research Council)

Arterial HOV Facilities in Canada (Canadian Urban Transit Association)

Traveler Response to System Changes – Chapter 2 (Transit Cooperative Research Program)

Transit Signal Priority: A Planning and Implementation Handbook (United States Department of Transportation)

Location and Design of Transit Stops

2.3.1 Design and locate transit stops to enhance accessibility and user comfort while balancing the requirements of an efficient *transit* service.

The location and design of bus and streetcar stops is an important factor in determining how far *pedestrians* must walk to reach transit services and the quality of the wait once they get there. A transit stop is the most consistently visible image of a town or city's transit system. When stops are poorly designed and maintained, difficult to reach or uncomfortable for users, it can negatively affect the image of a transit system and reduce opportunities for capturing choice ridership.

Since transit cannot usually provide universal door-to-door access, ensuring that stops are easily accessible to a large percentage of the public is important to enhancing ridership. A designated waiting area, designed for comfort in all seasons and for people of all ages and abilities, is important to enhance user satisfaction and reduce the perceived waiting time.

Within a system there may be several different types of stops related to the existing and planned level of passenger activity or the location of the stop within the system. There could include minor stops which exist along the length of a transit route, major stops at the junction of two connecting routes and interchange stops at major transfer points within the system. The amenities provided at transit stops, such as benches and bike racks, should reflect these differences with higher levels of amenity at higher volume locations or significant points of interchange within the system. Transit stops also need to be designed for universal access. Ontario's Accessibility for Ontarians with Disabilities Act (2005) will require municipalities and transit agencies to meet standards for transit stop accessibility under the Built Environment Standard. Guideline 3.4.1 provides resources and links to Ontario's accessibility policies and legislation.

Strategies Legend

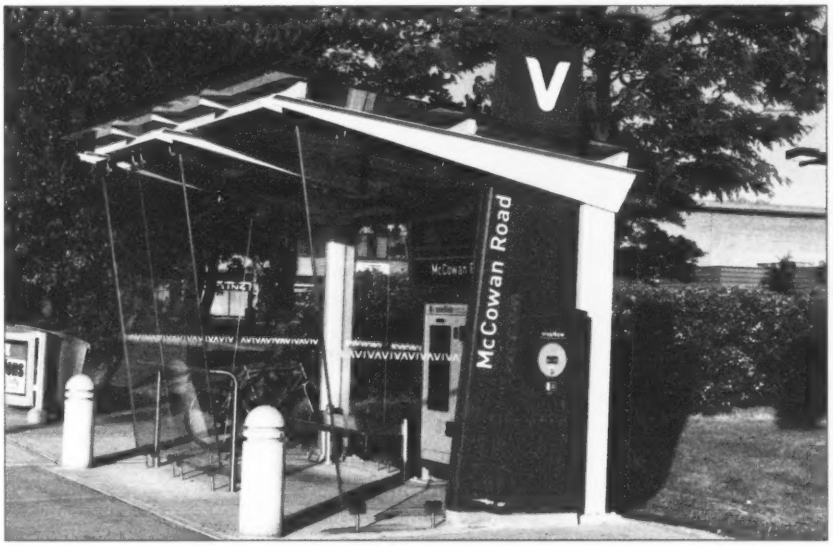
Green Action

Applicable Community Scale

- Small
- Mid-size
- Large
- Big City

Planning Scale

- (S) Site
- (D) District
- (M) Municipal
- (R) Regional



This transit stop in York Region is composed of high quality materials that provide clear sightlines to surrounding areas. The shelter provides *real-time trip planning information* and incorporates a ticket vending machine for pre-paid boarding. Users are supported through amenities such as seating, waste receptacles and bike racks.

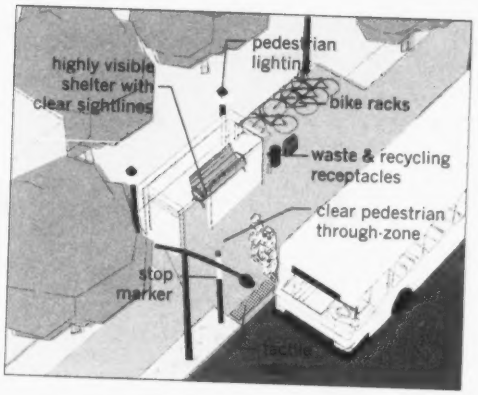
Strategies:

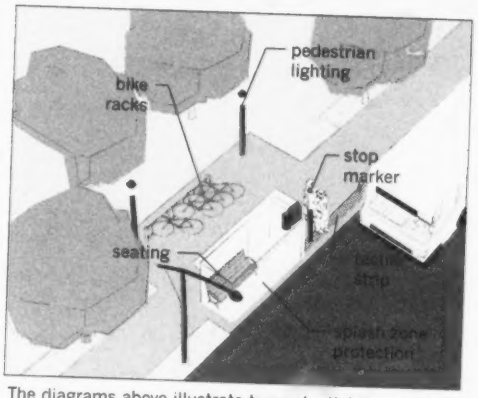
location

1. Transit users are generally willing to walk 400 m to a local stop or 800 m to a rapid transit station. The placement of local stops at between 200 and 250 m apart supports an average 400 m walking distance to local stops within an interconnected network of streets and blocks. For express or rapid transit services supported by a network of feeder transit, spacing stops greater than 250 m apart is often appropriate to limit stops, reduce travel times and maintain route efficiency. (R) (M) (D)
2. To maximize pedestrian access and minimize walking distances, locate transit stops at points where *local roads* intersect with collectors and arterials. (R) (M) (D)
3. Locate transit stops in highly visible locations along well-travelled routes and support their function through the design of adjacent development (Section 2.4). (M) (D)
4. Locate transit stops next to uses that generate high transit use such as seniors residences, hospitals, social services, large employers, retail uses and entertainment venues (Guideline 1.1.7.5). (D)
5. Locate stops on the near or far side of intersections as appropriate to the circumstances:
   - Locate stops on the near side of the intersection to accommodate pedestrians near a cross walk and provide the driver more control of the bus as he/she makes the stop and then proceeds through the intersection. (D)
   - Locate stops on the far side of the intersection to reduce interference where there is a high volume of turning vehicles and bus service is frequent. Far side stops allow the bus to proceed through a green signal, and make it easier for buses to re-enter traffic. (D)

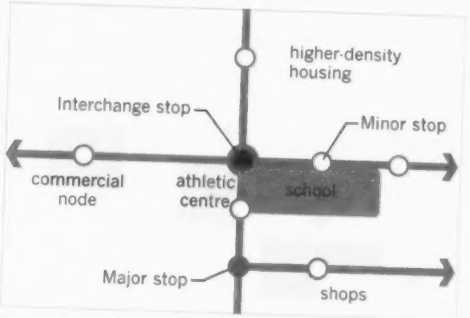
waiting area design

6. Design transit waiting areas so they:
   - connect to the sidewalk and provide direct access to all transit vehicle doors;
   - are well lit and highly visible from the street with clear sightlines to both approaching and parked transit vehicles and surrounding uses;
   - are constructed of high quality weatherproof materials that resist slipping and drain well;
   - avoid changes in grade and obstructions that can hinder people with mobility issues, carts or baby carriages; and
   - alert the visually impaired of their presence and, if appropriate, the location of various elements through the use of tactile strips or paving. (S)
7. Establish a regular maintenance schedule that includes snow clearance during winter months. (M)
8. Transit stops adjacent to ditches or swales should incorporate direct, level connections leading from the sidewalk to the edge of the curb. (S)





The diagrams above illustrate two potential transit stop configurations demonstrating a range of strategies in this guideline. The stop in the top diagram creates a waiting area away from the street. Stops should be located adjacent to a street only where there is low traffic volume.



Transit stops that are easily accessible and located near intersections and trip-generating uses can boost ridership.

A shelter within a transit station in Saint Paul MN, incorporates user-activated radiant heating in order to enhance passenger comfort during colder winter months.

A heated bus shelter in Brampton provides real-time arrival information and provides waiting passengers with the choice of both internal and external waiting areas.

user amenities

9. The provision of cycling facilities at transit stops is desirable as it enables passengers to bike to the stop. Where there is the increased potential for cyclists, such as along cycling routes or where distances between stops and local destinations are long, cyclists should be accommodated with bike racks and where appropriate, sheltered racks and/or bike lockers. (R) (M) (D)
10. Incorporate landscape treatments that preserve views but improve the environment for waiting passengers by providing shade from the sun and shelter from the wind. This can enhance the user experience, environmental performance and the image of the system. (S)
11. Provide a higher level of passenger amenity such as the provision of a transit shelter, pre-payment facilities and *real-time trip planning information* at bus stops where two routes intersect or in areas with a high number of boardings. Ridership counts can be determined through a range of methods as outlined in Section 3.2 of this document. (M) (D) (S)
12. Official plans can contain policies encouraging the integration of transit shelters/waiting areas into the design of buildings adjacent to the street. These can be achieved through *density bonusing* or site plan agreements and can take the form of:
    - overhangs that provide shelter for waiting passengers;
    - highly visible internal waiting areas that provide shelter and warmth during winter months; and
    - front lobbies and ground floor circulation areas located adjacent to stops. (M) (S)
13. Design transit shelters to be comfortable and highly visible with transparent sides, seating with armrests to support passengers with mobility issues and lighting. (S)
14. Provide all transit stops with garbage and recycling receptacles for waiting users. (S)
15. Design shelters to accommodate a range of users including people with carriages or wheelchairs (Guideline 3.4.1). (S)
16. Where service is infrequent, transit stops should include a range of amenities including shelters, benches and waste receptacles. (S)
17. Incorporate passenger-activated radiant heating at remote stations or when headways between vehicles are long. This can help to improve user comfort during colder winter months. (S)

public art

18. Incorporate public art at transit stops to enhance the user experience and foster a positive image of the system. Artwork can be used to reflect local characteristics or commemorate the unique history of an area.
19. Employ high-quality materials in transit stop artwork so that it can stand the test of time, be easily maintained and contribute to a positive image of transit facilities. (S)

Incorporating transit shelters or waiting areas into adjacent buildings such as this example in Toronto will help to enhance connections between transit stops and adjacent uses and can provide additional comfort for passengers during hot summer or cold winter months.

Recommended Resources

Guidelines for the Location and Design of Bus Stops (Transit Cooperative Research Program)

Design Guidelines for Accessible Bus Stops (BC Transit)

Transit Design Standards and Guidelines (Grand Junction/Mesa County Metropolitan Planning Organization)

Bus stop location policy (Christchurch City Council, NZ)

The Canadian Transit Handbook, 3rd ed., Chapter 8: Customer Access (Canadian Urban Transit Association)

Location and Design of Transit Stations

2.3.2 Design *transit* stations to enhance connectivity between different modes of transportation while supporting a positive user experience. As convergence points of community mobility and activity, they should be designed to contribute to a positive neighbourhood identity and to integrate within their surroundings.

Transit stations are important centres of activity that can help to strengthen the relationship between the surrounding community and transit network. They are gateways providing supportive amenities and information for travellers and in many cases act as a connecting point between multiple modes of transportation. Stations are the traditional hubs of many of our towns and cities and their presence has historically had a significant influence on the way our communities have grown and developed. Ensuring that new and existing stations are designed to integrate with their surroundings is an important strategy towards enhancing station access for a wide range of users and contributing to a pedestrian-friendly environment that will support transit ridership.

As places of transfer between different modes of transportation, it is important that stations be organized to enable the efficient movement of passengers from one mode to another while providing an environment that is enjoyable and comfortable for users.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

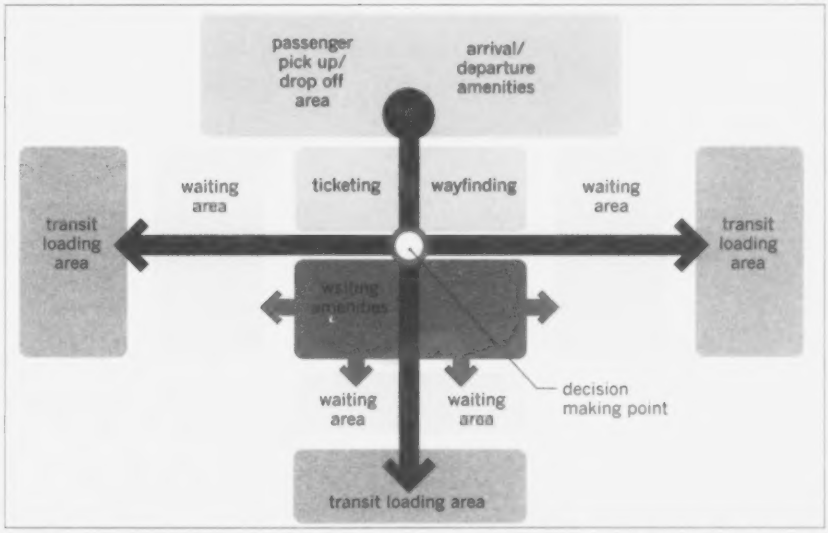
Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional



A rational progression of facilities with clear and direct routes that take passengers from their arrival point to their mode of transit with few decision-making points will help people to find their way around the station quickly and easily.

Strategies:

location & access

1. As important community and transportation hubs new stations should be located where they can enhance access to the transit network, create more efficient intermodal connections and act as catalysts for new *transit-supportive* development. (M) (D)
2. Design stations to integrate into their surroundings by providing connections for a range of users including *pedestrians* (Guideline 2.3.3), cyclists (Guideline 2.3.4) and other transit vehicles (Guideline 2.3.5). (D) (S)
3. Transit agencies should work with local land owners to secure pedestrian and cycling connections to and through adjacent developments for users going to and from the station. (D) (S)

design treatments

4. Design larger station sites to support long-term *intensification* by establishing development parcels and preserving land for the creation of new streets and open spaces that strengthen connections to surrounding areas. (S)
5. Encourage transit station design excellence. High-quality design can create a landmark for the local community and raise the profile of transit services. (S)
6. Extend transit station design beyond the platform and waiting areas to encompass the wider *public realm* of the station area and its surroundings. (D) (S)

legibility

7. Design stations to be easily navigable, or "legible" to users with clearly defined areas related to station functions. Provide clear, direct routes between station facilities and the various converging transportation modes. (S)
8. Develop a level of design consistency at larger stations to increase user familiarity with station facilities and enhance station *legibility*. Wayfinding strategies for transit facilities are highlighted in Guideline 3.3.3 of this document. (S)

amenity

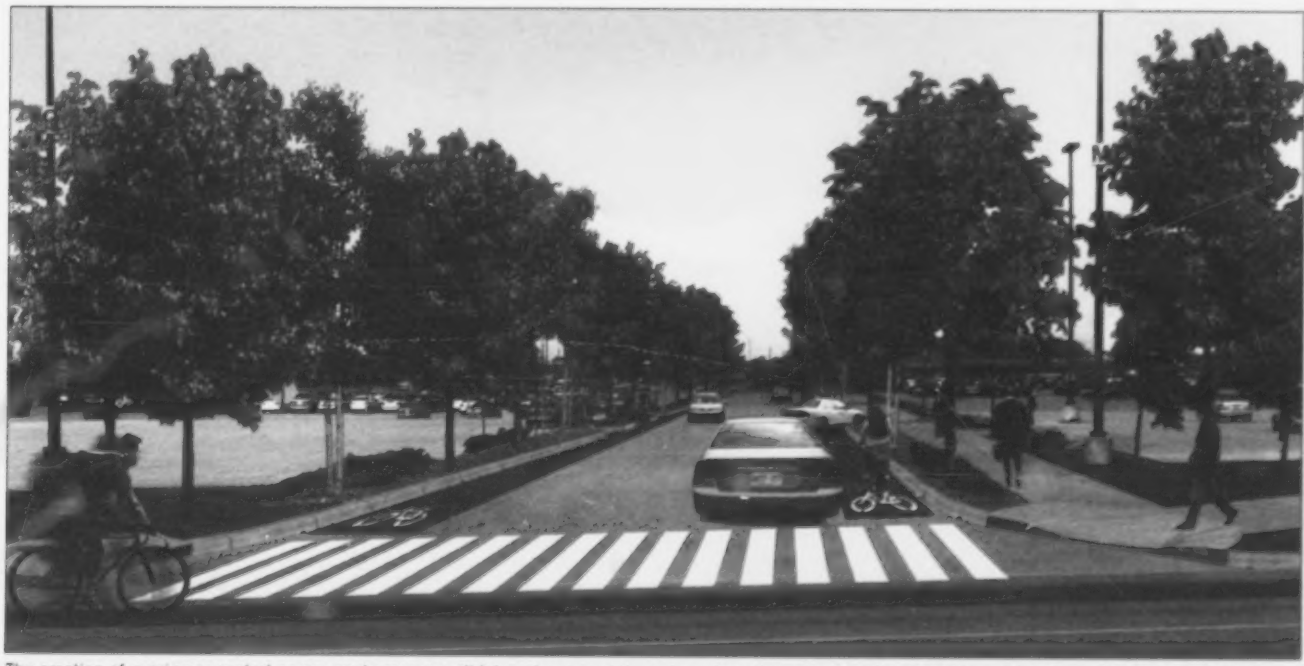
9. While the level of passenger amenity will vary at each station, stations should support user enjoyment through the creation of comfortable spaces and the provision of user amenities and ancillary uses such as drinking fountains or convenience retail services (Guideline 3.4.2). (S)

surface parking

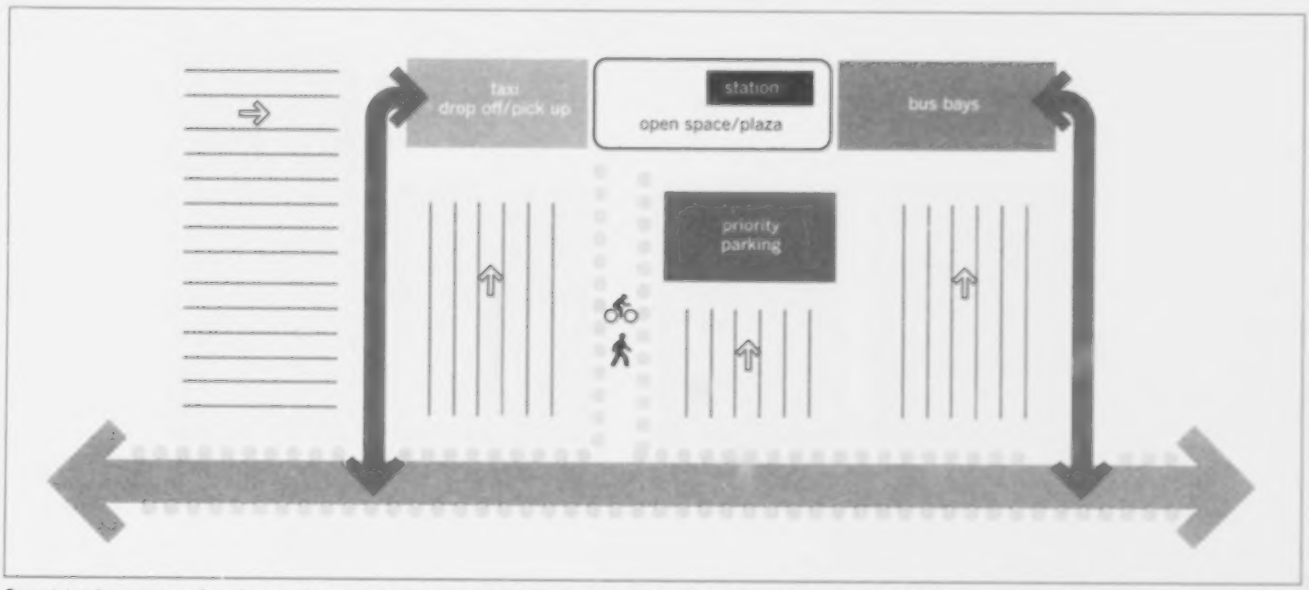
10. Discourage or limit provision of free surface parking in station areas where frequent feeder transit service is available, in order to support local transit ridership and make more land available near the station for higher-density development and a mix of transit-supportive uses (Guideline 2.5.2). The creation or expansion of parking areas must measure the benefits of new ridership against the associated costs including construction and maintenance, neighbourhood impacts and impacts on more local transit services. Where possible, opportunities to increase access to station areas through transfers or more active forms of transportation should be prioritized. (S)

This bus station in Burnley, UK provides a range of amenities to support waiting passengers including a convenient café, seating areas located where passengers can see their arriving vehicles, real-time information and wayfinding signage.

Detroit's Rosa Parks Transit Center not only integrates several modes of transit, it creates a local landmark that helps to raise the profile of the city's transit service.



The creation of a primary central access route can consolidate entrance points and create a clear structure for pedestrian and cycling infrastructure leading to and from the station.



Organizing large areas of surface parking into smaller modules can facilitate access for all users while establishing future development parcels for intensification over time. In this diagram, taxi and drop off and pick up areas have been located to feed directly onto the station plaza while accessible parking and parking for smaller vehicles and/or shared vehicles has been given priority immediately adjacent to the station.

11. Where densities are low and the ability to provide *feeder bus* service is limited, provision of parking can encourage longer distance and inter-regional transit ridership. Once parking is in place, patterns of use should be monitored (Guideline 3.2.2) to determine rider catchment areas and identify opportunities for new feeder service or pedestrian and/or cycling infrastructure as demand increases over time. (S)

12. Where parking is provided, allocate priority spots and establish free or preferential pricing for carpool vehicles, scooters and motorcycles which use less space per person (Guideline 2.5.2). (S)

13. Structure surface parking lots to create a clear pattern of circulation that can minimize pedestrian, cyclist and vehicular conflicts, supports safe pedestrian access from parking areas and enable the intensification of station areas over time. Strategies include:

    - creating a primary central access route between the public *rights-of-way* and the station entrance that can act as the principle vehicular point of access and accommodate pedestrian and cycling infrastructure such as sidewalks and bike lanes leading to and from the station.
    - organizing large areas of surface parking into smaller parking areas of 300 cars or less separated by a landscaped buffer and pedestrian pathways. This can help to break up large expanses of parking and facilitate pedestrian travel from parking areas to the station.
    - aligning parking aisles in the direction of the station to reduce the need for pedestrians to cross parking aisles or between rows of parked cars. (S)

14. Explore opportunities for reduced parking size dimensions and parking aisle requirements that can help to minimize land requirements. (D) (S)

parking structures

15. Situate parking structures where they will not impede the long-term *redevelopment* and *intensification* potential of the station area (Guideline 2.4.3). (D) (S)

drop off & pickup

16. Provide dedicated taxi areas and passenger drop/off and pick up areas adjacent to the station building or associated station open space (Strategy 2.3.3.6). Taxi stands should be accessible (Strategy 2.5.2.8), clearly delineated from other drop-off/pick-up areas and designed for one way traffic flow with room for waiting cars to queue. (S)

17. Passenger drop-off and pick up areas should be designed to support frequent vehicle turnover and minimize conflicts between pedestrians and vehicles. Include anti-idling provisions. Safety can be enhanced through the provision of a curbed sidewalk adjacent to the passenger door. Where dedicated curb side drop off is not feasible, these areas should be designed as "shared" pedestrian/vehicular spaces through the use of special paving or markings designed to enhance driver awareness. (S)

A rendering of potential station improvements around a commuter rail station illustrates how the creation of a central access point with pedestrian and cycling amenities can help to create safer pedestrian and cycling access, across the parking lot to the station.

Pedestrians in commuter parking lots tend to walk directly to and from the station, and may not use pedestrian pathways and sidewalks provided when there is a more direct route from their vehicle. Aligning parking aisles in the direction of the station reduces the need for pedestrians to cross parking aisles or pass between parked vehicles.

Recommended Resources

Mobility Hub Guidelines (Metrolinx)

Bus Rapid Transit: Volume 2 – Implementation Guidelines (Transit Cooperative Research Program)

Warwick Intermodal Station (State of Rhode Island Department of Transportation)

Enhancing Access for Pedestrians in Station Areas

2.3.3 *Transit* stations and station areas should be designed to prioritize *pedestrian* access while accommodating the needs of other users such as cyclists, transit and motor vehicles.

The movement of people in and around stations or transferring between different transportation modes requires an emphasis on design of the pedestrian realm. Transit stations and station areas should have adequate capacity to accommodate peak pedestrian volumes safely and comfortably. While efforts may be made to support pedestrian movement on the way to the station, if provisions are not made for pedestrians within the unique environment of a station it can affect user satisfaction and deter ridership.

Ensuring that people can move safely, efficiently, and comfortably within or around a station is therefore an important strategy to enhancing user experience and promoting greater ease of use.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

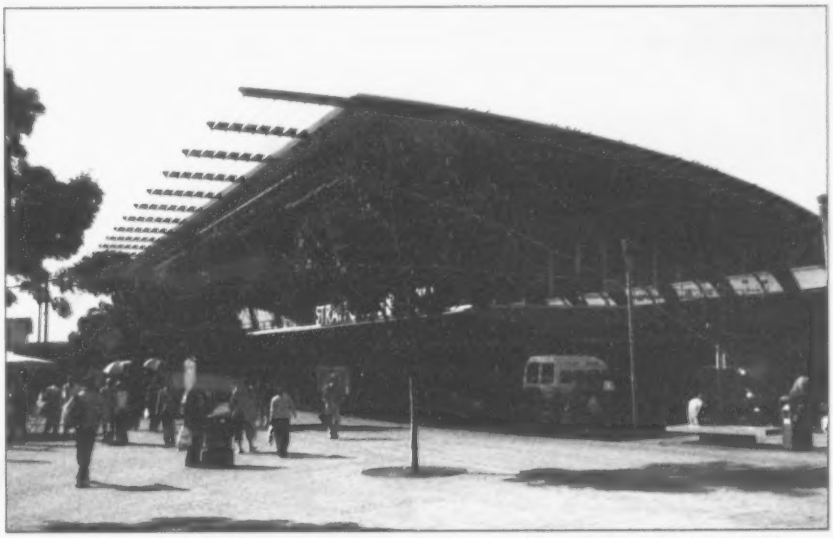
Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional



The *pedestrian plaza* at the Stratford Station in London, UK creates a receiving point for pedestrians and helps to facilitate transfers between modes.

Strategies:

pedestrian connections

1. Treat the sidewalks in and immediately adjacent to a station as *pedestrian priority areas*. They should contain a higher level of pedestrian amenity than surrounding areas, including:
   - signage and wayfinding to inform users where they need to go to reach the station and area destinations;
   - *pedestrian-oriented lighting* for enhanced visibility and safety;
   - seating and waste receptacles for convenience; and
   - landscaping for pedestrian comfort and enjoyment. (D) (S)
2. Organize sidewalks and pathways within station areas so they provide continuous, direct connections to area destinations and pathways outside the station area. A regular maintenance schedule, including snow removal, should ensure that sidewalks are clear of obstructions or significant debris year-round. (S)
3. Provide a broad *pedestrian through zone* with a suggested width of 2.4m or more, for sidewalks in station areas with wider sidewalks, with a suggested width of 3m or greater, at stations with high levels of pedestrian activity. (S)
4. Minimize conflicts between pedestrians and cyclists by locating bicycle storage facilities close to the road, so that cyclists will not be encouraged to ride across pedestrian areas. (S)

station buildings

5. Situate station buildings as close as possible to surrounding developments and areas of pedestrian activity to minimize walking distances. A pedestrian flow analysis can ensure that adequate room at station entrances is provided. (S)

open space

6. *Pedestrian plazas* or open spaces can act as important organizing elements within a station area. They help facilitate transfers between modes, act as receiving points for pedestrians and contain a range of amenities for users. (S)

wayfinding

7. Locate wayfinding maps at all major entrances indicating where the user is within the station area and the location of major station destinations. Supplement these signs with a wider context map directing pedestrians to important local destinations. Wayfinding strategies for station facilities can be found in Guideline 3.3.3 of this document. (S)

waiting areas

8. To avoid pedestrian conflict and promote station *legibility*, ensure pedestrian waiting areas are clearly identifiable and delineated from areas of pedestrian circulation. (S)
9. User comfort in outdoor pedestrian waiting areas can be enhanced through the use of year-round plantings that provide shelter from the wind in winter months and shade during hot summer months. (S)
10. Design outdoor waiting areas to increase passenger safety and comfort with clear sightlines to the station building and surrounding areas, and ensure areas are well-lit, clean and cleared of snow in winter. (S)

The waiting areas at this station in Blackwood, Wales have been positioned to preserve a generous area for pedestrian circulation.

Wayfinding maps located in strategic locations can help to enhance station legibility for users.

Recommended Resources

BART Station Access Guidelines (Bay Area Rapid Transit)

Station Site and Access Planning Manual (Washington Metropolitan Transit Authority)

Enhancing Access for Cyclists in Station Areas

2.3.4 Station design should promote the use of cycling as a component of a wider transportation system by providing accommodations for cyclists entering the station area, safe and convenient bike storage and amenities to support riders on their journey.

Accommodating cyclists at transit stations through provision of bike storage and other facilities is an important component of a multi-modal transit strategy. Cyclists' ability to travel distances that might be too long to walk but are too short to be convenient for transit makes cycling an important mode of transportation: one that is able to connect transit users comfortably to a whole range of destinations within a 3 to 5 km radius of a station area.

If cyclists are unable to conveniently access station areas or find safe and secure parking for their bicycles they will be discouraged from riding to the station. Just as *pedestrians* require a certain level of amenity, cyclists require infrastructure and facilities to enable them to safely move within a station area, minimize conflict with other vehicles and pedestrians and support them at both the beginning and end of a trip.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

Planning Scale

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Sheltered bike facilities located in highly visible locations, such as this example in Oakville, help discourage vandalism and theft. The use of closed rings provides two points of contact for parked bicycles. This provides greater stability and makes it easier to lock the bike.

Strategies:

access 1. Keep cycling routes and pedestrian pathways within the station area separate to minimize conflicts. Where cycling routes to and from bike parking are adjacent to pedestrian areas or transit zones, such as a bus loop, they should be clearly marked through the use of distinct paving treatments and signage. (D) (S)

2. Cycling access points and routes should be clearly identified and located to minimize conflicts with transit and private vehicle users. Where cyclists share access points with private vehicles, they should be provided dedicated or painted curb-side lanes to minimize conflicts. (S)

3. Avoid barriers to cyclists such as curbs or stairs, where possible. Where they exist, stairways leading to and from station areas should be outfitted with bike ramps or elevators. (S)

wayfinding 4. Locate clear wayfinding signage around the perimeter of station areas and at the terminus of primary cycling routes, directing cyclists to the appropriate station access points and cycling facilities. (D) (S)

parking 5. Cyclists should be provided with sheltered and secure bicycle storage facilities at all transit stations and bike racks at stop locations. (S)

6. Locate bicycle parking in highly visible, well-lit or security-monitored areas to discourage vandalism, and in places that minimize conflicts between pedestrians, cyclists and transit vehicles. (S) (M)

7. Bike racks should be firmly secured and support the bicycle in two places to promote stability. (S) (M)

8. Provide a sufficient number of bicycle lockers in station areas to enable commuters to store their bicycles and complete their commute. Transit providers should undertake a periodic review of usage to gauge demand for additional lockers. (S)

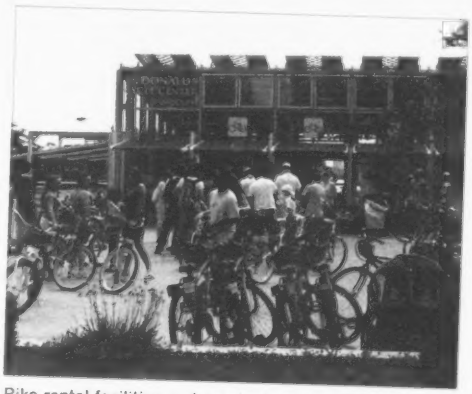
amenities 9. Consider implementing bicycle amenities at major transit stops and terminals. See Guideline 3.4.2 on planning bicycle amenities. (M)

10. Provide amenities such as drinking fountains, air pumps and a repair stand within a station area. These can help support riders on their journey. (S)

11. Consider providing bike rental or *bike share* facilities within station areas. Bike share or rental facilities can act as an extension of the transit system, enabling transit to reach local destinations without having users bring their own bicycles on transit vehicles or leave them parked overnight at a station or stop. (S)

maintenance 12. Maintain bicycle facilities during winter months to support year-round cycling. (S)

Where stairs exist, the use of bike ramps, such as this one at Millennium Park Bicycle Station in Chicago, can help to facilitate access for cyclists.



Bike rental facilities and repair shops integrated into larger transit centres, such as this one in Millennium Park, Chicago, help to encourage passengers commuting to transit stations to cycle and can help departing passengers reach local destinations.

Recommended Resources

Case Study: Cycling Facilities

BART Bicycle Access and Parking Plan (Bay Area Rapid Transit)

Ontario Bikeways Planning and Design Guidelines (Ontario Ministry of Transportation)

Station Site and Access Planning Manual (Washington Metropolitan Transit Authority)

Integrating Bicycling and Public Transport in North America (Pucher, J. and Buehler, R)

Enhancing Transfers between Systems

2.3.5 *Transit* stops and stations should be designed to facilitate the efficient transfer of passengers between different modes of transportation and across jurisdictions.

As cities and towns move towards more integrated, inter-regional transportation, ensuring efficient transfers between systems will become increasingly important. Inconvenient transfer points and poorly integrated systems can add substantial time to multi-transfer journeys discouraging transit use and encouraging the use of private motor vehicles.

Enabling users to efficiently transfer between systems is key to the creation of a more user-friendly transit network capable of competing with the flexibility of the automobile. Special attention should also be made to ensure transfers between transit systems, in particular between conventional and *specialized transit* services, are accessible to people with disabilities through step-free environments and other measures. If connecting transit systems are not coordinated, longer, cross-jurisdictional journeys, which have the greatest potential for replacing private automobile trips, can be severely delayed.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional

The layout of this station in Nashville facilitates easy transfers between systems.

Strategies:

minimizing transfer times

1. Co-locate the transit facilities associated with different systems/modes where feasible to enable quick transfers. This should include the co-location of public and private service providers such as coach services and specialized transit services. (R) (M)
2. Where the co-location of facilities is not feasible, provide direct, dedicated connections between the two systems/modes. (S)
3. Situate bus platforms and passenger drop-off and pick-up locations associated with rapid transit or rail stations where they can provide passengers with direct access to the station. The creation of a transit plaza / *pedestrian plaza* is one strategy for integrating transfer points within a station area. (S)
4. Design platforms at stations to minimize walking distances for connecting passengers and avoid grade changes between platforms and local transit connections. Where feasible, all modes should share the same platform to eliminate the need to change platforms. (S)
5. Prioritize bus traffic over other motorized vehicles at regional rail or rapid transit stations to facilitate faster transfer times and speed up bus services. (S)

coordination

6. Coordinate transit routes and schedules to minimize waiting times for transferring passengers. Further information on transit scheduling can be found in Guideline 3.1.2 of this document. (M)
7. Transit agencies serving different jurisdictions should coordinate routes and schedules to fill missing gaps in the system (Guideline 3.1.2). Where a station is located at the edge of two jurisdictions, the respective transit agencies should collaborate in the design and retrofit of the stations to ensure the seamless integration of facilities. (R) (M)
8. Consider *fare integration programs* that facilitate more seamless intercity or interregional travel (Guideline 3.5.1). (R) (M)

Bus only lanes at major transit hubs in Los Angeles speed access times for connecting services, reducing travel delays.

Recommended Resources

Station Site and Access Planning Manual (Washington Metropolitan Transit Authority)

BART Bicycle Access and Parking Plan (San Francisco)

Mobility Hub Guidelines (Metrolinx)

A rapid transit station in Stockholm places a convenient waiting area between the subway platforms to the left and bus terminal to the right.

Layout and Orientation of Buildings within a Block

2.4.1 The layout and orientation of buildings should help to support the creation of pedestrian-friendly streets and open spaces designed to enhance activity around, and connections to, stops and station areas.

The act of locating higher-density development and uses adjacent to a transit stop does not always equate to *transit-supportive* development. To be transit-supportive, new developments and existing communities should treat transit as a central organizing element and aim to increase ridership by orienting buildings so that activity is focussed on streets and open spaces in and around transit stops and station areas. Transit-supportive development should support a high level of walking and cycling and help to strengthen connections between transit facilities and surrounding areas.

Buildings can help to support an active *pedestrian* environment through careful consideration of the way they meet the street. Architectural variety, including the creation of prominent architectural features so that buildings can act as landmarks on the street and the use of clear windows and doors, can help to create an interesting and inviting environment, shortening perceived walking distances, assisting pedestrians in navigating to stations and in turn encouraging higher levels of pedestrian activity. Through the use of massing and transitions in height and density, buildings can help to frame and enclose the street giving areas a stronger sense of identity and helping to integrate higher-density station areas into surrounding development.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

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(S) Site

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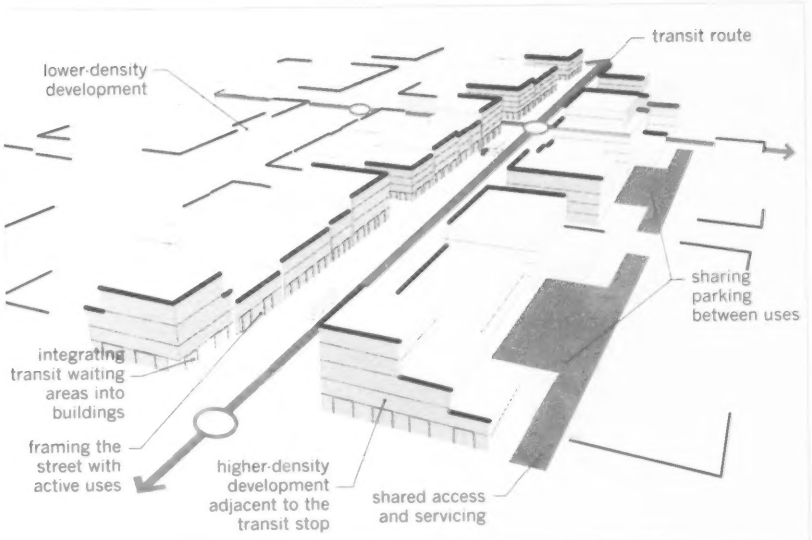


The layout and orientation of buildings can help to support transit use by focusing activity adjacent to transit stops and station areas and minimizing the impacts of parking.

Strategies:

street relationship

1. New development and *redevelopment* should orient towards the street and contribute to a pedestrian-friendly *public realm* by:
   - situating buildings close to the streetline or transit station so that they frame the street or station area and contribute to ground-level pedestrian activity;
   - orienting primary entrance points and street level uses to support higher levels of activity along key pedestrian routes, stop or station locations and at waiting areas; and
   - designing building façades to actively address public streets and open spaces through the use of transparent glazing, windows, doors and other "active" architectural treatments. (S)
2. Buildings with active street level uses should incorporate frequent entrances to increase *permeability*. (S)
3. Avoid the *reverse lotting* of uses, long stretches of blank walls, berms or high fences adjacent to the street. These limit street activity and prevent *natural surveillance*. (S)

responding to context

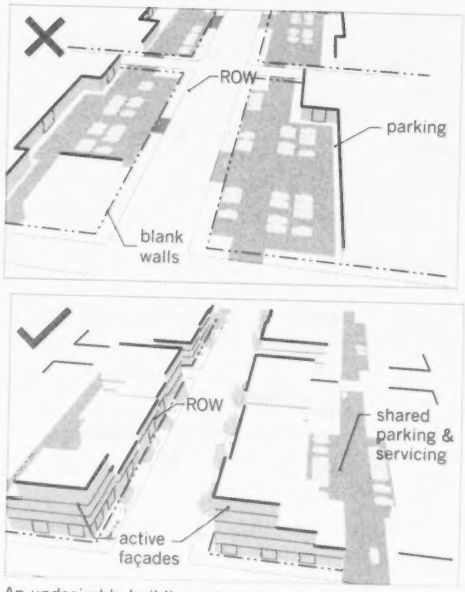
4. Support areas with high levels of pedestrian activity through building setbacks and pedestrian amenities such as integrated waiting areas, pedestrian lighting, and weather protection. (S)
5. Locate higher-density buildings close to transit stops or station areas to support a greater mix of uses, higher levels of pedestrian activity and transit ridership. (D) (S)
6. Scale buildings to match their specific context. Transitions in building scale can enable higher-density uses close to transit stops/stations while integrating with the scale and character of surrounding communities. (S)

integrating transit

7. Opportunities to integrate *higher order transit* stops such as subways or rapid transit stations into the base of buildings should be pursued where appropriate. (S)

parking & access

8. Orient vehicular access, parking and servicing to minimize pedestrian conflicts and impacts on street level activity. (S)
9. Coordinate new developments with existing and planned uses to consolidate vehicular access points, minimize curb cuts and share servicing. (S)
10. Larger developments that require the use of internal roadways or drives should organize these elements in a manner that strengthens connections between adjacent uses and transit facilities and helps to establish a finely-grained network of interconnected streets and blocks. (S)
11. Ensure *mid-block connections* are direct, well-lit and fronted by or visible from adjacent uses to enhance pedestrian safety and comfort. (S)



An undesirable building orientation (top) places entrances and active uses away from the street, while parking becomes the most visible element of the streetscape. A more desirable building orientation (bottom) places active uses and building entrances at the *right-of-way* (ROW), creating a continuous street wall and a more attractive pedestrian environment.

Long stretches of blank walls and fences adjacent to the street create an unpleasant pedestrian environment with limited activity and no passive surveillance.

Recommended Resources

Urban Design Compendium (English Partnerships and the Housing Corporation)

Transit Oriented Development Policy Guidelines (City of Calgary)

Design of Parking Facilities

2.4.2 Locate and design parking so that it can support the creation of an active and attractive *public realm*.

Parking requirements that respond to a car-oriented environment can often make it challenging to move to higher-density, urban development patterns. As higher-density, walkable places, in close proximity to *transit*, *transit-supportive* places require a shift in the way parking is mandated, managed and designed.

It is important that the design and location of parking is unobtrusive and not a detriment to the quality and vitality of surrounding streets and open spaces. This is particularly significant around transit stops and in station areas where the quality of the *pedestrian* environment and street level activity has been shown to have a direct relationship to ridership levels, perceptions of safety and ease of access. In downtowns, town centres and areas of higher density, this means dramatically reducing surface parking and placing parking underground, in above-grade parking garages and/or screened from pedestrians behind buildings. Where surface parking exists, the creation of a street and block structure within larger lots can help to enhance pedestrian connectivity, establish parcels for future development and provide additional on-street parking.

Strategies Legend

Green Action

Applicable Community Scale

- Small
- Mid-size
- Large
- Big City

Planning Scale

- (S) Site
- (D) District
- (M) Municipal
- (R) Regional

This surface parking lot in Portland, Oregon is screened from the street, includes provision for pedestrian circulation and cyclists, and incorporates environmental features such as permeable paving and bio-swales that can absorb and filter stormwater run-off. Accessible parking has been located near the principal accessible entrance.

Strategies:

parking structures

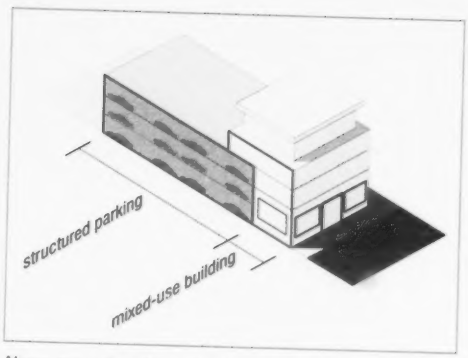
1. Provide parking in *nodes* or *corridors* in below-grade or *structured parking* facilities, where possible, to allow for higher-density development and active street-level uses. (S)
2. Where feasible, wrap above-ground parking structures in residential, retail or commercial uses to screen parking from the street and increase street-level activity. (S)
3. Providing access ramps along active street frontages or on primary pedestrian routes should be discouraged to minimize conflicts between pedestrians and vehicles. (S)
4. To reduce the visual impact of structured parking along a street, treat the façade like an active building frontage (Guideline 2.4.1). Reflect the characteristics of more active building types through techniques such as:
   - *screening* diagonal ramps and non-horizontal parking plates with horizontal banding elements;
   - screening parked cars from view through the use of walls, windows or parapets; and
   - incorporating active uses at grade that can contribute to the animation and activity of the street. (S)

street parking

5. Paid, on-street parking can minimize the need for dedicated parking spaces, providing space for short-stay visitors and helping to support *main street* retail uses. On-street parking adjacent to bike-ways should provide an additional 0.6m of width indicated by lines or hatching, to accommodate car door openings, which could interfere with cyclists (Guideline 2.2.4).

surface parking

6. Prohibit surface parking between a building and a street within designated nodes or corridors. (D) (S)
7. Where possible and costs permit, particularly where there are large areas of parking, design surface parking lots to include dedicated provisions for pedestrian circulation, including internal walkways and pedestrian priority paving treatments. (S)
8. Where larger areas of surface parking exist, encourage the introduction of a street and block pattern within the parking lot that can help enhance pedestrian access, enable the introduction of *streetscape* treatments and create development parcels for *infill* over time. (S)
9. In *designated growth areas* and where higher densities are planned, encourage development applications and master plans to demonstrate how large areas of surface parking can be redeveloped over time. (D) (S)
10. In the design of large areas of surface parking, encourage the inclusion of a range of environmental features, such as solar panels, shade trees, permeable paving and bio-swales that can absorb and filter stormwater run-off. See Guideline 2.5.2 for other measures to address the sustainability of parking facilities. (S)



Above ground parking structures should be wrapped with active uses to screen parking from the public realm.

Recommended Resources

Parking Facilities (National Institute of Building Sciences)

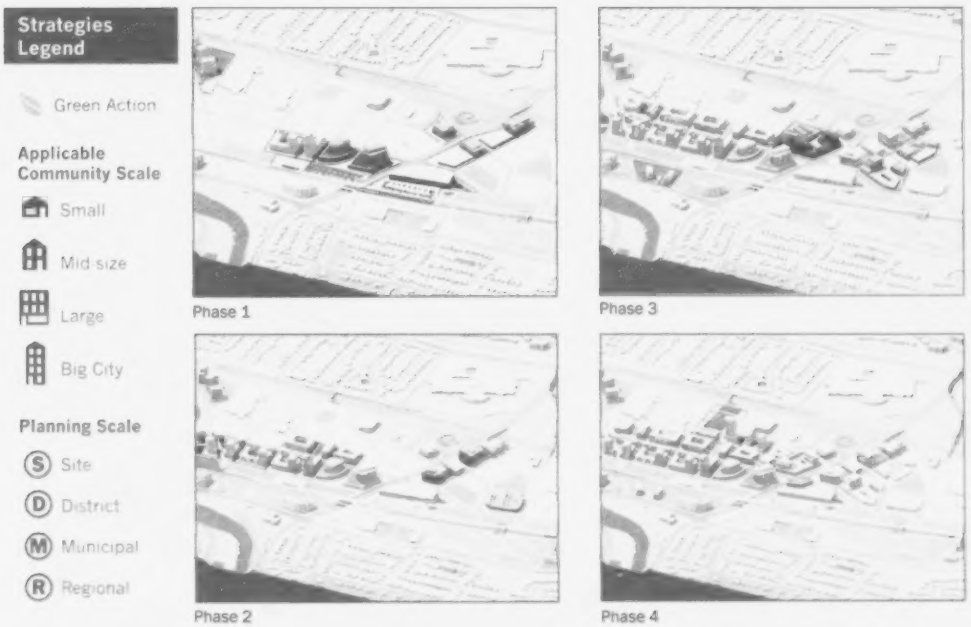
Design Guidelines for Greening Surface Parking Lots (City of Toronto)

Intensification of Station Areas

2.4.3 Planning for station areas should take into consideration the potential for *intensification* over time.

Station areas represent opportunities for *transit-supportive* development, with the potential to attract new riders and generate much needed revenue for fiscally constrained *transit* providers. Many station areas are underutilized, with significant amounts of land dedicated to surface parking. The design and location of station area facilities can also make the introduction of new uses difficult. Restricted access resulting from transit *infrastructure* and multiple authorities with responsibilities in the area can also complicate matters.

Recognizing and planning for the intensification potential of station areas can allow station facilities and infrastructure to be designed and located so that they do not hinder the long-term development potential of the station area.



Phased *intensification* surrounding a transit station in Oakville, ON. The creation of a station area vision that establishes a framework for gradual intensification can help to ensure that short-term decisions don't preclude the long-term development potential of a station area.

Strategies:

general

1. Ensure new development within station areas is transit-supportive (Guideline 2.4.1), fronting key *pedestrian* areas with active uses, helping to integrate the station area into surrounding neighbourhoods and supporting opportunities for new uses and further intensification over time. (D) (S)

2. Municipalities and transit agencies should consider the potential for the intensification of station areas when planning for new investments to ensure that they support the long-term development potential for the intensification. (D)

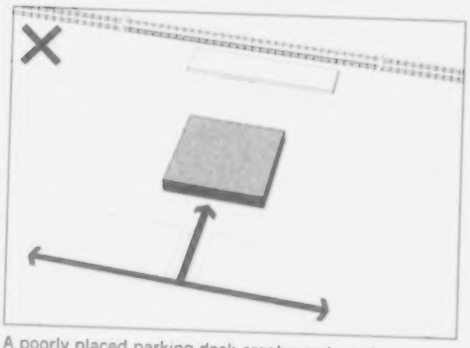
3. Weigh the benefits of new development on station lands against the impacts on access and operations. (D)

4. Transit agencies should identify and prioritize stations with the potential for further intensification. Give priority to stations where intensification has the potential to generate higher levels of transit ridership or where intensification would enhance the relationship of the station to its surroundings, strengthen connections and provide enhanced amenities for transit users. R M

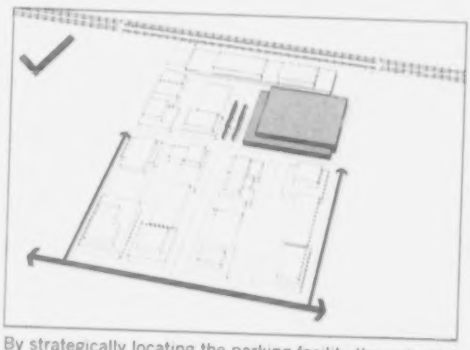
planning process

5. The creation of station area visioning documents can be a helpful tool in planning for the intensification of station areas by establishing the expectations of the transit agency and creating a starting point for discussions with development partners. A visioning document should:

   - identify a long-term vision for the station area that is both compatible with the surrounding pattern of development and consistent with local planning guidance;
   - establish a framework for the gradual intensification of the station area while addressing and preserving for the needs of transit operations, including pick-up and drop-off areas, passenger amenities and managed parking spaces;
   - identify potential development parcels and the desired characteristics of related development, including appropriate built form, *public realm* characteristics, transportation networks, key connections and land use characteristics; and
   - outline an implementation strategy for achieving the vision that helps to guide both public and private investments within the station area. M D



A poorly placed parking deck creates awkward development parcels that are too small for intensification of the station area.



By strategically locating the parking facility the potential for long term intensification of the station area can be preserved.

Recommended Resources

Case Study: Station Intensification

Mobility Hub Guidelines (Metrolinx)

The Big Move Strategy #7 (Metrolinx)

Station Site and Access Planning Manual (Washington Metropolitan Area Transit Authority)

Brentwood Station Area Redevelopment Plan (City of Calgary)

Parking Management Strategies

2.5.1 A range of parking strategies should be implemented in and around station areas to encourage a shift away from higher levels of automobile use and minimize the impacts of parking on the *public realm*.

The transition from an automobile-dependent environment to one that is transit-supportive can be a slow process occurring over many years. Strategies to accommodate parking will be required to support that transitional period and assist in shifting *modal split* and enabling the emergence of a more pedestrian-friendly transit-supportive environment.

While parking may be required in stop and station areas, the over provision of free or low cost parking and creation of areas that are dominated by parking infrastructure can have a negative impact on ridership and the *pedestrian* environment as well as providing an incentive for single-occupant vehicle use. An effective parking management strategy should be multi-faceted, providing a range of parking options suited to different users while acknowledging that the end goal is a reduction in overall auto use and an increase in more active, shared forms of transportation. To be effective, parking strategies must be tied to the availability of good *transit* service. In the absence of good service, businesses that will remain largely dependant on vehicular traffic can suffer and adjacent areas without management strategies in place can experience increased levels of traffic and parking demand as drivers seek to avoid paying higher costs.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid size

Large

Big City

Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional

Permitted Use	Morning Occupancy Rate	Afternoon Occupancy Rate	Evening Occupancy Rate
Assembly hall	10%	25%	100%
Business office	100%	95%	10%
Commercial fitness centre	25%	80%	100%
Hotel	80%	75%	100%
Industrial use	100%	95%	10%
Recreational use	25%	80%	100%
Retail store (not including a shopping centre)	50%	100%	100%
Theatre	0%	50%	100%

Markham's shared parking policy identifies a series of occupancy rates for different uses at three time periods throughout the day. When there is an opportunity for two adjacent uses to share parking, the total parking required in the zoning for each use is first multiplied by the applicable occupancy rates (above). This determines the parking requirements for each use during each of the three time periods. The sum of the parking requirements for the two adjacent uses at each time period are then added to give combined parking requirements for each time period. The largest of these three sums becomes the minimum shared parking requirement.

Strategies:

reducing demand

1. Require large developments, institutions and employers to submit *transportation demand management (TDM)* strategies as a component of the site plan approval process. These could include a range of features such as *car share* spaces, cycling facilities or programs such as a carpool strategy, emergency ride home program, private shuttle services and transit fare incentives. Also see Guideline 3.5.5. (M) (D) (S)
2. Encourage existing uses to implement TDM strategies by showcasing examples of local developments, institutions or businesses that have incorporated similar measures. Local business improvement associations could be approached to assist in implementing TDM strategies. (M)
3. Permit reductions in maximum and minimum parking requirements once TDM measures are adopted. Reduce or eliminate maximum and minimum parking standards for small scale retail uses and ground floor commercial uses near transit routes and designed to cater to pedestrian traffic. (D) (S)

maximizing resources

4. Encourage shared parking arrangements between uses to reduce the need for parking spaces within a development. (S)
5. Maximize the use of street parking to reduce the need for stand alone surface or *structured parking*. Use daily rates rather than monthly rates in structured parking to reduce parking demand. Street parking can be maximized through flexible stall spacing that will enable smaller cars to occupy less space, meters that encourage vehicle turnover, and the use of time restrictions. (D)
6. The use of off-peak street parking on arterials and collectors can enable parking in places that may be congested during peak periods. When locating on-street parking, consider the width available for cyclists to pass parked cars safely as drivers open their car doors. (D) (S)

standards

7. Explore the potential for more compact parking standards that can enhance the efficiency of existing lots. (M) (D) (S)
8. Evaluate and consider reductions in minimum and maximum parking supply requirements near transit routes. Establish parking supply standards appropriate to existing and planned densities, mix of uses, existing and planned levels of transit service and modal split. Review standards on a regular basis and change as appropriate. (M) (D) (S)
9. Permit off-site, shared and existing on-street parking to count toward parking requirements. (M) (D) (S)

planning strategies

10. The establishment of *parking improvement districts* can be used to direct net or surplus revenues from paid parking lots back into the district. These revenues can contribute to the development of more shared parking facilities, snow removal, or other parking related infrastructure. Additional funding for these could be partially achieved through a cash in lieu policy on area developments. (D) (S)

Shared parking and access between uses can help to balance parking fluctuations and reduce the overall need for parking spaces within a development or neighbourhood context.

The use of real-time parking displays, such as this one in Germany, can help to maximise existing shared parking resources by informing drivers of the location of available spaces within a structure or district.

Recommended Resources

Regional Transit-Oriented Development Guidelines (York Region)

Mobility Hub Guidelines (Metrolinx)

Parking and Loading Zoning Standards Review Phase One (City of Toronto)

Parking Pricing Implementation Guidelines (Victoria Transport Policy Institute)

Parking Best Practices & Strategies For Supporting Transit Oriented Development In the San Francisco Bay Area (Bay Area Metropolitan Transportation Commission)

Priority Parking Users

2.5.2 Encourage priority parking programs that promote a shift to higher vehicle occupancy and greater use of more efficient and sustainable modes of transportation.

Large cars and single-occupant vehicles use more resources than smaller and more efficient alternatives, both in terms of space for parking and their impact upon the environment. In areas where parking spaces are limited, such as station areas and around major stops, giving priority to preferred users such as carpool users and vehicles that occupy less space can be a strong incentive, promoting more space efficient modes of transportation. If four users occupy a single parking space, they are in essence freeing up three additional spaces for other users, maximizing the efficiency of existing parking and minimizing the need for additional spaces. The effectiveness of priority measures will be dependent on proper enforcement to ensure that priority spaces are not being occupied by unauthorized vehicles. Priority measures should be assessed on a regular basis for effectiveness and enforcement strategies planned accordingly.

Providing incentives for more space efficient modes of transportation is inherently sustainable. In addition, it can be beneficial to provide priority for more environmentally friendly forms of private transportation, such as bicycles, hybrid vehicles or electric cars in order to promote more sustainable transportation solutions.

Parking spaces also need to be designed for universal access. Ontario's Accessibility for Ontarians with Disabilities Act (2005) will require municipalities and transit agencies to meet standards for accessible parking spaces under the Built Environment Standard. Guideline 3.4.1 provides resources and links to Ontario's accessibility policies and legislation as they develop and are implemented.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional

The Dow Jones Princeton campus has 60 preferred parking spaces for cars with high miles per gallon (36 mpg or higher) and carpoolers.

Strategies:

parking priority

1. Locational priority should be given to accessible parking spaces as well as carpool and *alternative energy vehicles* such as hybrid or electric cars at stations and within municipally-owned parking lots in and around station areas. (M) (D) (S)
2. The provision of charging stations at priority locations within station areas can help support electric vehicle use. This enables users to charge their vehicles while travelling via *transit*. (S)
3. Where parking spaces are limited, consider the provision of priority parking for cyclists, scooters, motorcycles and small cars, which occupy less space, as an incentive to encourage the most efficient use of parking areas. (S)
4. Prioritizing cyclists and integrating cycling facilities in parking lots at major stops and station areas can help promote higher levels of cycling access. Strategies to promote and enhance access for cyclists can be found in Guideline 2.2.4. (D) (S)

paid parking

5. Charging for parking in and around all major stops and station areas can help promote a shift toward alternative forms of transportation. (D) (S)

incentives

6. Transit agencies and *transportation demand management* associations should consider the creation of carpooling programs that can help riders find carpool partners and promote incentives such as priority parking to members who carpool to station areas. (R) (M)
7. Enable the provision of *car share* services, which provide paid access to a vehicle shared between multiple users, to count toward parking requirements. (M) (D) (S)
8. The first priority for parking should be given to accessible parking spaces. Locate accessible spaces, as well as accessible taxi services, close to the shortest accessible route leading to the main accessible *pedestrian* entrance of a building. Accessible parking areas should be:
   - connected to destinations by routes that avoid curbs, streets and access drives;
   - designed of firm, stable and slip resistant surfaces with no slopes;
   - maintained year round;
   - well marked and identified by the International Symbol of Accessibility;
   - designed to include spaces of an appropriate width as per Ontario's Accessibility for Ontarians with Disabilities Act standards; and
   - provided with wayfinding signage directing users to the nearest accessible entrance if the location of the space is distant or out of view from accessible entrances to the building. (S)

The prioritization of scooters and motorcycles at this GO Transit Station in Ajax helps to encourage the use of vehicles that require less space to accommodate.

Recommended Resources

Parking Standards Review: Examination of Potential Options and Impacts of Car Share Programs on Parking Standards (City of Toronto)

Parking Management – Strategies, Evaluation and Planning (Victoria Transport Policy Institute)

Park and Ride Electric Vehicle Charging Stations (King County Department of Transportation, WA)

Station Access Strategy (GO Transit)

LRT Carpool Parking Program (City of Edmonton)

Major Transit Stations

2.6.1 *Major transit stations* should be designed to optimize their potential as *transit-supportive* places. Plans should be put in place to capitalize on new development and *place-making* opportunities that can help to integrate them into their surroundings and support connections between various modes of movement.

Major transit stations are focal points within a community's transit network that act as important reception areas for riders and places of transfer between various modes and systems. As convergence points, they are often complicated by multiple layers of *infrastructure* required to support various modes, including *pedestrians* and cyclists, and in many cases, automobiles. This can have an impact on the way in which these uses interact with their surroundings. Overlapping infrastructure can negate potential for *intensification* and the creation of transit-supportive environments and may create awkward connections for passengers.

Given the high levels of transit service provided, major transit stations represent important opportunities for the development of transit-supportive environments, which can attract new users and support higher levels of access. Ensuring that major transit stations afford seamless connections between various modes of transportation is an important strategy towards reducing regional travel times and enhancing access to the transit system.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

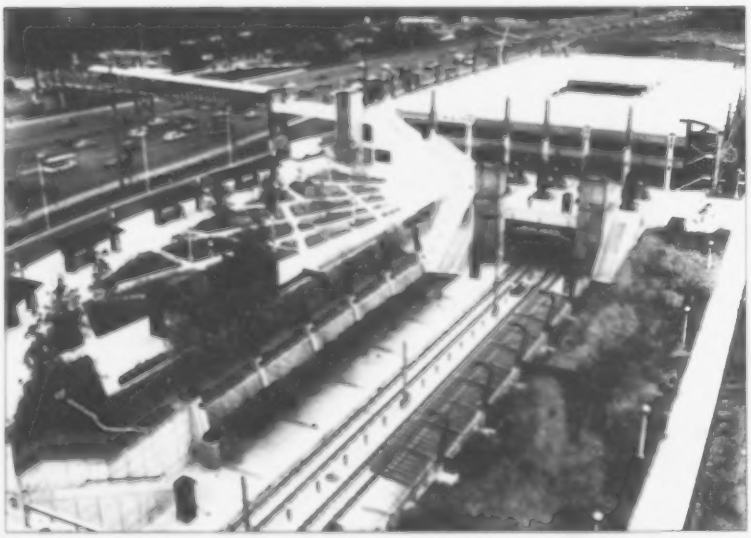
Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional



The Sunset Transit Center in Oregon is a major transit hub bringing together, LRT, bus, *park and ride* and cycling facilities. The Center has been designed to create a welcoming environment for users with high-quality architecture and the integration of a signature open space.

Strategies:

maximize investment

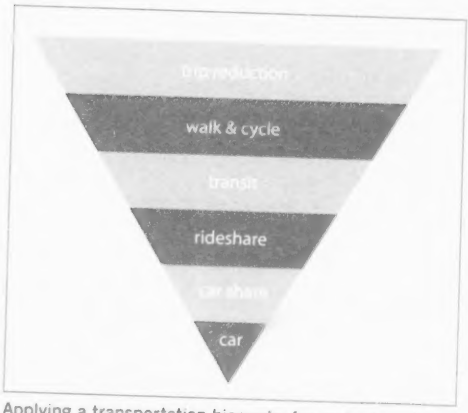
1. Maximize the investment in transit at major transit stations by ensuring infrastructure is organized in a manner that preserves the potential for transit-supportive development in and around the station. This can be achieved in a number of ways including:
   - the establishment of a *land management strategy* in and around existing and proposed transit stations to preserve opportunities for new development;
   - promoting compact inter-modal facilities that minimize loss of *redevelopment* opportunities while maximizing efficiency for transit riders; and
   - establishing station area visions (Guideline 2.4.3) and development frameworks to outline intentions for that station area and guide investments in infrastructure. (R) (M)

prioritizing movement

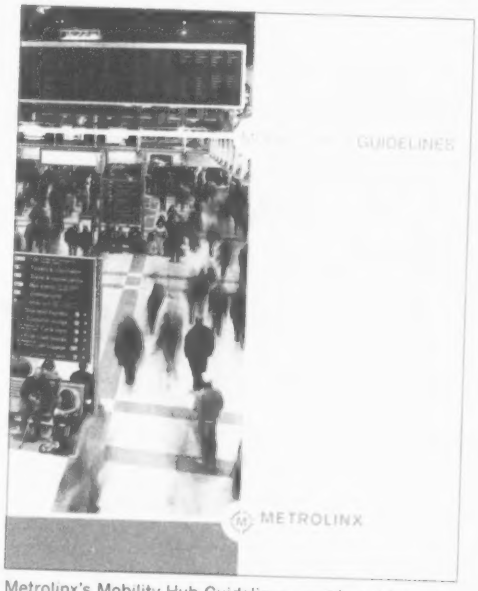
2. Within and around major transit station areas, prioritize initiatives that promote travel behaviour and transportation modes according to the following hierarchy:
   - Vehicle trip reduction: encouraging a mix of uses within and around the station and enhancing intermodal connections to avoid or reduce trips;
   - Walking and cycling: enhancing access for pedestrians and cyclists;
   - Transit: providing efficient access and egress for transit vehicles;
   - Ridesharing: promoting access for *high occupancy vehicles* such as carpools
   - Car sharing and taxis: facilitating car sharing and passenger drop-off;
   - Single-occupant vehicles: providing safe and efficient automobile parking and access. (R) (M)

design

3. Design major transit stations as welcoming, hospitable and vibrant public places that strengthen connections to and between surrounding areas and act as focal points of neighbourhood activity. (D) (S)
4. Design major transit stations to strengthen community identity through the use of high quality architecture and *public realm* treatments such as public art, streetscaping, street furnishings and landscaping. (D) (S)
5. Provide a mix of higher-density residential, commercial and service uses reflective of the level of transit service in and around the station area. This will support transit ridership and promote a more vibrant pedestrian environment. (D) (S)
6. At transit stations on larger land parcels, introduce a walkable network of public streets that can help to support intensification and enhance community connectivity. (D) (S)
7. Municipalities or transit agencies should develop policies for major transit stations to ensure that they are initially developed as, or can evolve into, transit-supportive environments. (R) (M) (D)



Applying a transportation hierarchy for major transit stations prioritizes trip reduction and more active forms of transportation.



Metrolinx's Mobility Hub Guidelines provide guidance for the development of major transit stations designated as mobility hubs in the Greater Toronto and Hamilton Area.

Recommended Resources

Mobility Hub Guidelines (Metrolinx)

Union Station Master Plan and Union Station District Plan (City of Toronto)

Union Station Master Plan (Denver Union Station Public Authority)

Office Parks

2.6.2 The location, layout and design of office parks should promote *transit* use by strengthening the relationship between buildings and the street and incorporating a greater mix of uses that can help to activate the stop/station area and extend hours of activity.

As major hubs of employment, office parks can be significant generators of transit ridership. Unfortunately the location, layout and design of many suburban office parks are not supportive of transit. Buildings set back from the street and dispersed between large areas of surface parking create long walking distances for *pedestrians* and transit riders, while circuitous road patterns lengthen travel times and result in inefficient transit service. This is coupled with large single-use areas of office development that result in inconsistent levels of ridership with peaks during the morning and evening commute and low ridership throughout the day and evening.

Situating buildings close to the street will help to minimize walking distances for pedestrians, cyclists and transit riders, contribute to a more pedestrian-friendly street environment and minimize the impacts of large areas of surface parking. Incorporating a greater mix of uses throughout office parks and in particular clustered in and around stops and station areas will help to minimize service peaks and valleys and make it easier for area employees to readily access the services they may need throughout the day or evening.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

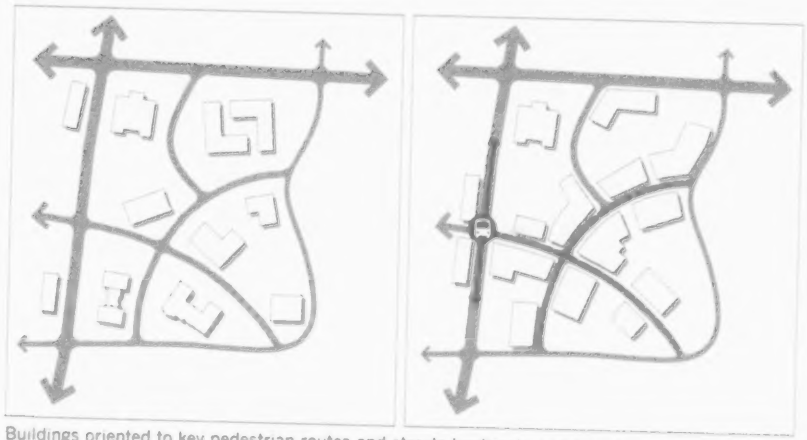
Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional



Buildings oriented to key pedestrian routes and streets leading to and from transit stops can help improve ridership. Likewise, in planning service for existing office parks, transit route planning may need to consider existing building entrances and exits in order to reduce walking distances for transit users.

Strategies:

land use

1. Avoid large, new single-use office parks, which result in usage peaks and valleys and require employees to travel longer distances to access services. Office uses should instead be encouraged to locate in *mixed-use nodes and corridors*. (R) (M)
2. The provision of a greater mix of uses should be encouraged in existing and planned office parks in order to maintain levels of activity throughout the day and enable more balanced provision of transit service. (M) (D) (S)
3. For offices adjacent to stop/station areas, incorporate a mix of ground floor uses such as restaurants, retail or service uses that can help to enliven the station area. (D) (S)

layout

4. Orient semi-public amenities such as cafeteria or gym facilities where they can help to animate key pedestrian routes or stop/station areas. (S)
5. Office parks often feature large block sizes, which inhibit connectivity. Where feasible, reduce block size and limit to a maximum 160m block length. (D) (S)

built form

6. Orient buildings in office parks to line key pedestrian streets and routes leading to and from transit stops/station areas. (D) (S)
7. Structure large areas of surface parking to create a more walkable street and block pattern through the alignment of driveways and introduction of sidewalks and streetscaping. (S)

parking

8. Reduce overall parking demand in office parks by:
   - requiring developments to implement *transportation demand management (TDM)* strategies;
   - eliminating mandatory parking requirements from zoning standards near transit routes;
   - encouraging greater use of shared parking; and
   - permitting shared on-street parking for visitors instead of dedicated single use visitor parking areas. (D) (S)

cycling

9. Given the larger block sizes and overall travel distances within office parks, encourage the provision of amenities that support cycling to work, including:
   - bike lockers at nearby stop or station areas to support commuting to and from the stop/station area; and
   - signed, marked cycling routes throughout the office park linking to transit facilities and local cycling networks. (D) (S)

shuttle services

10. Transit agencies are encouraged to work with employers to operate shuttle services from transit lines into office parks. (D)

Technology Square Development
Cambridge, MA

In 2002, a series of three ten-storey 1960s-era office buildings north of the MIT campus were renovated into a more transit-supportive, pedestrian-friendly, environment. Four new buildings were added to create a pedestrian corridor, ground related retail space and additional density.

Urban Form Case Studies: Employment Lands (Ontario Growth Secretariat)

Recommended Resources

Office development, rail transit and commuting choices (Cervero)

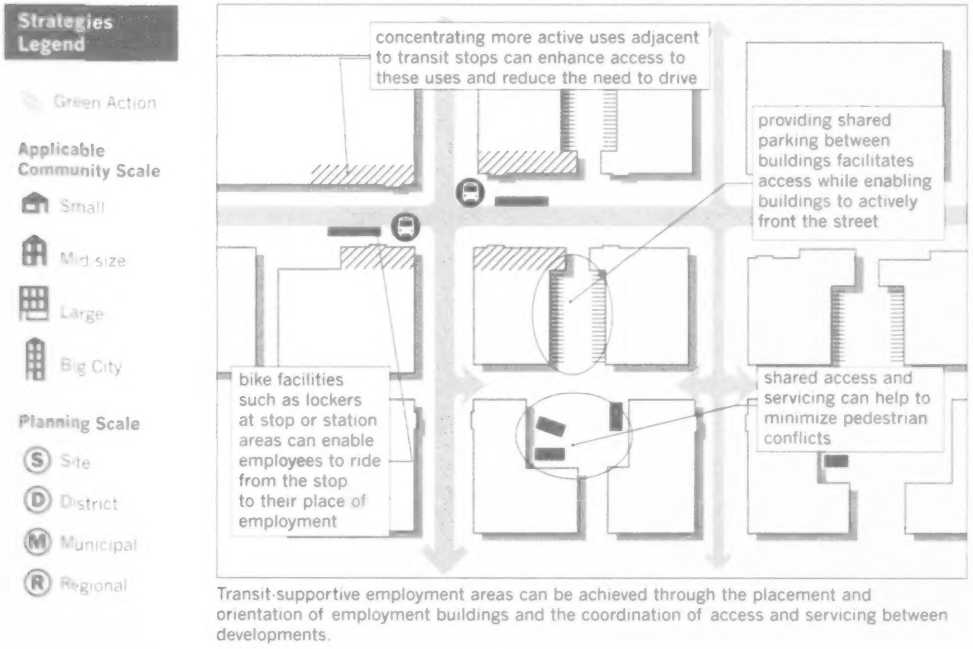
Transportation Demand Management for Site Plan Development (Arlington County Department of Environmental Services)

Industrial and Employment Areas

2.6.3 Industrial and employment areas should incorporate a greater range of uses and be designed to minimize walking distances and enhance conditions for *pedestrians* and cyclists.

Though important places of employment and potential key destinations within a *region* and municipality's *transit* system, the typically large lot sizes and low employment densities of industrial and employment areas result in environments that are difficult to access and are not *transit-supportive*. Large setbacks and block sizes in newer suburban employment areas create long distances between transit stops and result in a poor environment for pedestrians.

Incorporating a greater mix of uses, where permitted, creates an opportunity for the location of higher-density employment uses closer to transit. Concentrating higher-density employment and a mix of uses near existing and planned transit routes, where possible, can help to support higher levels of transit service and enhance employee access to a greater range of uses. By orienting buildings toward streets and designing them to contribute to the pedestrian experience, industrial and employment areas can be structured to enhance access for pedestrians and cyclists, minimize walking distances between transit stops and improve the character and quality of transit connections.



Transit-supportive employment areas can be achieved through the placement and orientation of employment buildings and the coordination of access and servicing between developments.

Strategies:

land use & density

1. Encourage higher-density employment and a mix of uses where appropriate, along designated transit *corridors* within employment and industrial areas. This can help to increase access to transit and support ridership (Guideline 1.1.7). (D) (S)

2. Locate uses with lower employment densities, such as larger manufacturing firms and warehousing or truck transportation firms that require extensive land areas for buildings and storage, further from transit. (D) (S)

3. Encourage employment-related services, retail and restaurants to co-locate at intersections and next to transit stops where they can be more easily accessed by local employees and discourage lunchtime automobile trips. (S)

4. Establish *minimum density thresholds* in industrial and employment areas, where appropriate. This can help to facilitate the provision of more cost effective transit service to these areas. (M) (D)

design

5. Orient buildings to front onto public streets as close to the street line as possible. This will enhance access for pedestrians and cyclists (Guideline 2.4.1). (D) (S)

parking

6. Discourage the provision of surface parking between the front of an employment building and the street. A preferable location is side-yard parking, which can be shared between uses and enables buildings to be situated closer to the street. (S)

access & servicing

7. The coordination of access and servicing between uses can help to enable the provision of *mid-block pedestrian connections* providing access to companies located in the interior of industrial and employment subdivisions. (D) (S)

8. Vehicular access and servicing should be shared and coordinated between adjacent developments at the site planning stage to minimize driveways. This will reduce the potential for conflict between vehicles, pedestrians and cyclists and improve the quality of the *streetscape* for people travelling to and from transit stops or station areas (Guideline 1.1.7). (S)

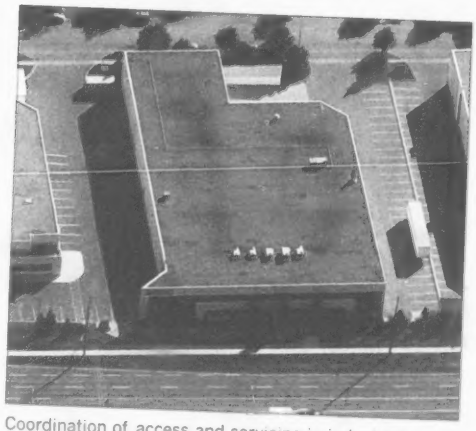
location of transit

9. Locate transit stops and shelters in coordination with adjacent uses and building entrances to increase opportunities for *natural surveillance*. This creates a more inviting environment for people waiting for transit (Guideline 2.3.1). (S)

cycling

10. Provide bike lockers at local transit stations and sheltered bike racks at places of employment and transit stops. This can help to support employees wishing to ride from their transit stop to work or visa versa. (D) (S)

11. Incorporate bike racks at bus stops and key destinations in and around employment areas in order to promote cycling as an option to access services during lunch hours or throughout the day. (D)



Coordination of access and servicing in industrial and employment areas, such as this example in Vaughan, can enable traditional employment buildings to be situated closer to the street.

Recommended Resources

Urban Form Case Studies: Employment Lands (Ontario Growth Secretariat)

Transportation Demand Management for Site Plan Development (Arlington County Department of Environmental Services)

Large Shopping Centres and Big Box Retail

2.6.4 The location, layout and design of large shopping centres and *big-box retail* uses should enhance access for pedestrians, cyclists and *transit* users while preserving for *intensification* that will enable the development of a *node* over time.

Large shopping centres and big box retail uses have the potential to act as significant generators of transit ridership. However, poor layout and design often limits transit use. Most large retail centres are set back from surrounding streets and surrounded by large areas of surface parking. This resulting in long walking distances between the shopping centre and nearby uses and/or transit routes.

In many instances, a lack of through streets and poor coordination between developments means that there is no coherent pattern of public streets, blocks and driveways. Pedestrians and transit users can be discouraged by having to traverse large parking lots to reach retail uses. Additionally, when direct access is provided, transit vehicles must take circuitous routes, increasing transit vehicle travel times.

While large shopping centres and big box uses should ideally be sited as close to the street or transit station as possible, in many instances these uses are dependent on large numbers of auto users and require large areas of surface parking. When designed carefully, surface parking can enhance connectivity between shopping centres and surrounding areas, increase pedestrian safety and create a pattern to support new uses and *transit-supportive* intensification over time.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

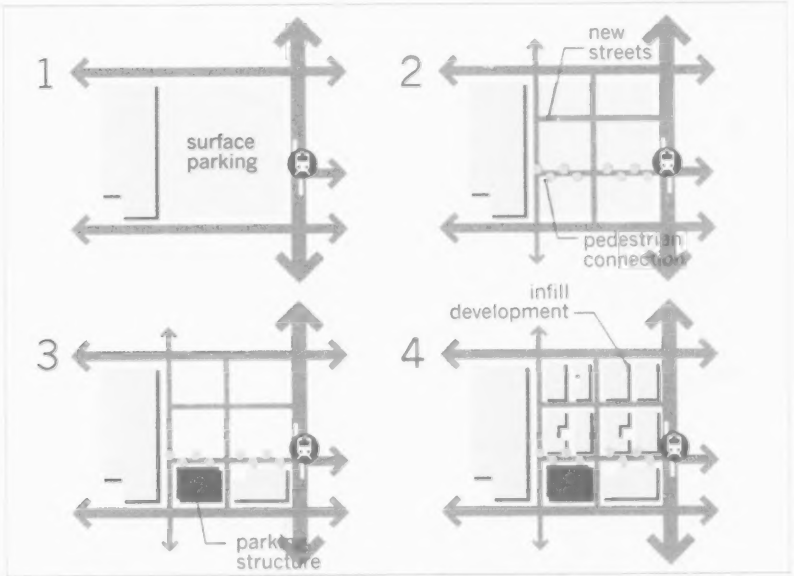
Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional



Planning shopping centres with a secondary network of streets and blocks can set the stage for long-term intensification. The use of parking structures can help to free up large areas of surface parking for new development.

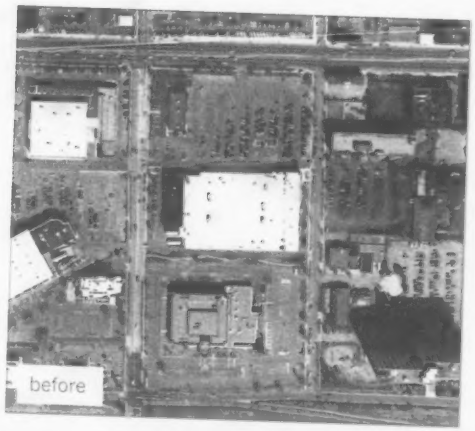
Strategies:

land use

1. Locate large shopping centres and big box retail uses in conjunction with a mix of higher-density uses including employment, commercial and residential uses. (D) (S)

layout & design

2. Locate suburban shopping centres and big box retail uses as close to the street and/or transit station as possible so they can enhance pedestrian access and contribute to street-level pedestrian activity. (D) (S)
3. At existing shopping centres, reduce the effect of blank walls facing streets or key pedestrian routes through the use of retail liners composed of smaller stores that can animate the street and enhance the walk for pedestrians. (S)
4. At large regional shopping centres, which act as focal points within a transit network, integrate transit facilities within the layout and design of their site. Transit facilities should:
   - be situated to minimize diversions from existing transit routes;
   - provide direct, dedicated pedestrian connections to the primary entrance of the shopping centre;
   - be designed to provide comfortable waiting conditions for passengers; and
   - integrate cycling facilities for transit and retail users. (S)
5. At large shopping centres and big box retail uses that are not sited against the street edge, put in place a pattern of secondary streets and blocks. In the short term this will facilitate access for pedestrians, cyclists and transit users, and in the long term will enable intensification and a greater mix of uses. This can be achieved by:
   - treating access roads and driveways as new streets with sidewalks and *streetscape* treatments that connect the retail uses with adjacent streets and surrounding developments;
   - aligning access roads and driveways with adjacent parcels so that they establish a continuous street and block network;
   - ensuring that new streets and driveways align with existing streets in surrounding neighbourhoods and developments; and
   - designing the street and block system to achieve a minimum *street intersection density* of 0.3 intersections per hectare with a minimum of 0.6 intersections per hectare in *mixed-use nodes* and *corridors*. (D) (S)
6. Where large shopping centres and big box retail already exist, ensure new buildings preserve opportunities for the gradual extension of a street grid through the site over time. (D) (S)
7. Reduce the minimum parking requirements for large shopping centres and office buildings to facilitate intensification in areas that are well served by transit. (D) (S)



The *redevelopment* of this big box retail use in St. Paul, MN established a pattern of streets and blocks that enhanced connections north to the corridor and will enable the gradual intensification of the site over time.

Recommended Resources

Malls into Mainstreets (Congress for New Urbanism)

Municipal Code – Large Retail Facility Design (City of Bellingham, WA)

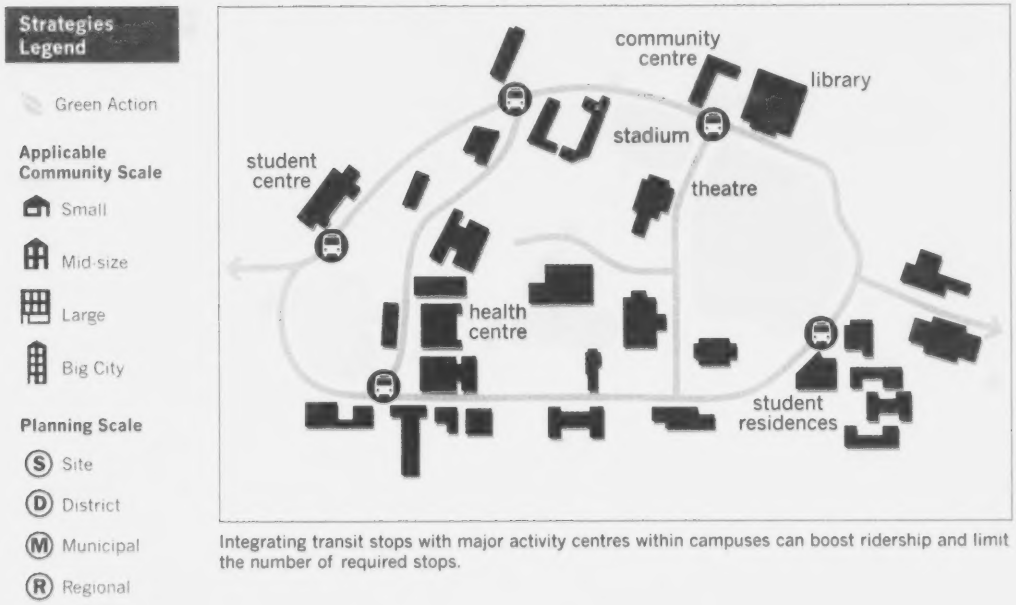
Central Corridor Development Strategy: Section 3.3 (City of Saint Paul, MN)

Institutional Campuses

2.6.5 Institutional campuses should work with local *transit* providers to coordinate *transit* service and ensure that key centres of activity are sufficiently served without detracting from the overall efficiency of a community's transit service.

The large number of trips generated by institutional campuses such as universities or hospitals means that they naturally become important hubs within a community's transit system. Despite this, the planning and design of these uses can often lead to environments that are not supportive of transit. Large areas of surface parking and buildings set back from the street can create unfriendly environments for pedestrians and increase walking distances. Multiple buildings and dispersed uses combined with irregular internal street patterns can pose difficulty for transit providers, creating circuitous routes that result in longer travel times.

Transit providers must balance a range of issues, primarily related to access, to ensure that clusters of activity within the campus are afforded the service they need without adding excessive time to the trip of other transit users. Higher transit usage resulting from better coordination of service can reduce demand for parking, freeing up areas of surface parking for new uses and minimizing parking overspill into adjacent neighbourhoods.



Integrating transit stops with major activity centres within campuses can boost ridership and limit the number of required stops.

Strategies:

coordination of service

1. Institutional campuses and transit agencies should coordinate routes to strike a balance between level of transit access within the campus and the efficiency of service provided. (S) (M)
2. Encourage institutions and transit agencies to coordinate schedules. This will ensure that the appropriate level of transit service is provided throughout the day and evening. Schedules should be reviewed on at least a yearly basis. (S) (M)
3. Establish inter-agency partnerships between institutions and transit providers. These represent opportunities to coordinate transit service and develop innovative funding or service arrangements. (S) (M)

enhancing access

4. Where feasible, provide transit service to major activity hubs such as libraries and student centres in the case of universities or out-patient wings in larger hospitals. (D) (S)
5. Locate transit stops/stations close to primary building entrances where they can afford easy access to facilities. Where opportunities exist, explore the integration of stops or stations in campus buildings. (S)
6. Where direct transit access to facilities is not feasible, provide direct pedestrian connections leading from the stop to the facility. These should be supported with a range of pedestrian amenities such as *pedestrian-oriented lighting*, seating and wayfinding signage directing users to their destinations. (D) (S)
7. Where institutional campuses are the primary generators of transit uses within a community, land should be set aside and consideration provided for the creation of an major transit hub capable of serving the multiple routes that may converge there. This should be located close to major activity centres such as libraries or out-patient facilities. (D) (S)
8. At hospitals, organize ambulance or patient drop off lay-by lanes to minimize impacts on key pedestrian routes leading into and out of the hospital. (S)

fare incentives

9. Consider fare incentives and programs such as a U-Pass system. U-Passes provide all students and staff with access to free or affordable transit fares and are an excellent opportunity to increase transit ridership (Guideline 3.5.1). (M)

planning process

10. Campus planning should account for the provision of transit to ensure that new uses can be adequately served by transit and/or can help to enhance ridership growth. (D) (S)

Institutional campuses can be significant generators of transit ridership.

U-Pass systems can significantly increase ridership while providing a discount for students.

Recommended Resources

University of Utah Campus Master Plan
(University of Utah)

Cornell Master Plan for the Ithaca Campus
(Cornell University, NY)

Public/Civic Infrastructure

2.6.6 *Public/civic infrastructure* should be planned and coordinated alongside long-term planning for *transit* to ensure that it is designed to support and accommodate future transit use.

Given the important role that highway interchanges, bridges, utility easements and other public/civic infrastructure elements have serving our towns and cities, they are often located along important movement corridors, which can become natural routes within an expanding transit network. In some cases, these strategic elements are designed to meet current demands in the absence of appropriate planning for future transit and/or enhanced facilities for pedestrian and cyclists. This may result in costly reconstruction at a later date if and when transit is planned, adding substantially to the cost of implementing new transit infrastructure or in some cases limiting the potential for transit altogether.

By accounting for potential long-term investments in transit at the outset, public/civic infrastructure can be designed to accommodate future transit investment. This can help to reduce costs, and in some cases ensure that the potential for transit is preserved where it might otherwise not have been.

Strategies Legend

Green Action

Applicable Community Scale

Small

Mid-size

Large

Big City

Planning Scale

(S) Site

(D) District

(M) Municipal

(R) Regional

Though a major thoroughfare, the Prince Edward (Bloor) Viaduct in Toronto has been designed to accommodate motor vehicles, pedestrians and cyclists, and includes a separa[illegible]vel beneath the road to accommodate subway trains.

Strategies:

preserving for transit

1. Plan and coordinate public/civic infrastructure alongside long-term strategic planning for transit and transportation. (R) (M)

2. Where public/civic infrastructure elements correspond with planned long-term transit networks, they should be designed to accommodate those future investments from the outset by:

   - preserving space on or below bridges or underpasses for transit vehicles and related uses such as carpools;
   - providing sufficient structural overbuild to accommodate the weight of future transit vehicles or related uses; and
   - ensuring that the location and orientation of infrastructure and associated elements preserve opportunities for future transit uses and/or access to transit facilities. (S)

3. In planning for utility corridors and associated easements, consider the potential to accommodate future transit corridors by:

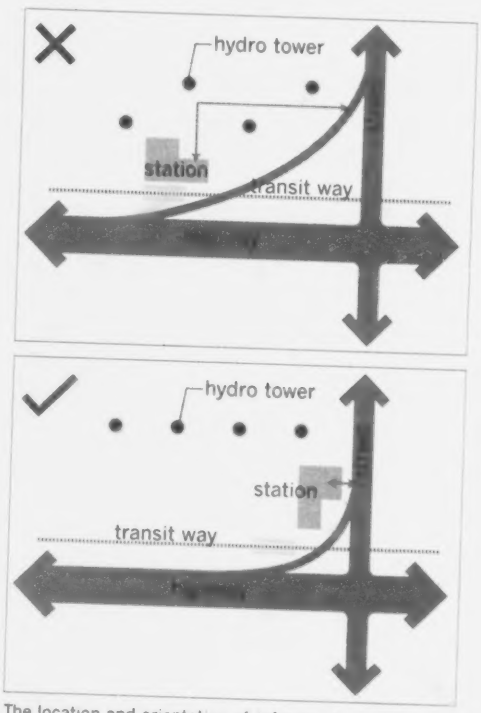
   - preserving space within the easement for future transit uses; and
   - locating elements such as hydro towers, maintenance facilities and systems facilities so that they optimize the potential for future uses within the easement. For example, situating hydro pylons where they won't inhibit future transit facilities beneath them. (R) (M) (S)

edestrians nd cyclists

4. Where possible, design public/civic infrastructure to integrate opportunities for walking and cycling. This includes the incorporation of elements such as sidewalks and dedicated bike lanes on bridges or the provision of *multi-use trails* along utility easements and corridors. (S)

5. The reconstruction of bridges and other public/civic infrastructure should be viewed as an opportunity to enhance conditions for pedestrians and cyclists. (S)

A new underpass in Toronto includes accommodation for both pedestrians and cyclists and has been designed to accommodate the introduction of a streetcar line over the long term.



The location and orientation of infrastructure and related elements can impact the design of transit facilities at a later date. Where necessary, proximity to major infrastructure should be discussed with the appropriate jurisdictional authority.

Recommended Resources

Multi-Modal Bridges (Transport Canada)

Chapter 3

Transit Improvement Guidelines

The quality of transit systems, including services, operations, programs and facilities play an important role in enhancing user experience and increasing usage. Chapter 3 contains strategies aimed at growing ridership through a range of typical tools, management approaches and technologies including:

- **System Service and Operations**
  Optimizing system service and capacity to meet community needs (pg 96)
- **Planning and Performance Monitoring**
  Monitoring and evaluating the performance of transit systems to respond to community needs (pg 108)
- **Trip Planning and Navigation**
  Enabling users to navigate the system and plan their trips (pg 116)
- **Passenger Accommodation and Service**
  Creating accessible facilities that meet customer needs while increasing user safety and comfort (pg 124)
- **Ridership Strategies**
  Developing programs and strategies to target and increase ridership (pg 136)

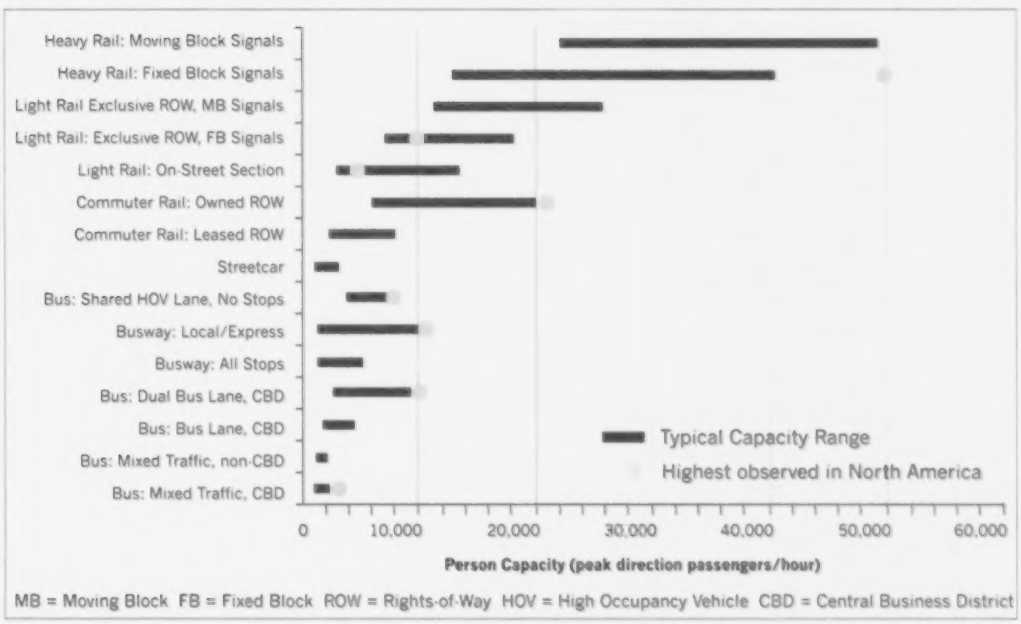
Smaller communities may wish to pay particular attention to the strategies outlined in Guidelines 3.1.3, 3.5.2 and 3.5.3 of this chapter.

Transit Service Types

3.1.1 Select a transit service type that provides the capacity and service quality appropriate to local population and employment densities. Service types should be designed to support the function and character of the environments they serve.

The type of transit service selected is a primary determinant of system capacity, quality of service and attractiveness to transit riders. By nature of the transit *rights-of-way*, and stop and station locations, the selection of a service type will also have a significant impact on community structure, the movement of *pedestrians* and vehicles as well as the potential for new *transit-supportive* development.

Transit providers may select from an array of service types ranging from demand-responsive transit services to conventional buses in mixed traffic with fixed-routes and schedules, to vehicles on dedicated lanes or guideways, such as *bus rapid transit* (BRT), *light rail transit* (LRT), subways and/or commuter trains. Moreover, different service types may complement each other, such as the combination of conventional bus and BRT services or the use of feeder services along LRT routes. Each service type differs in its appropriateness, capital costs, permanence and route flexibility, as well as its impact and influence on the character of a community.



The chart above identifies a series of person-capacity ranges for various transit modes (adapted from TCRP 100 Transit Capacity and Quality of Service Manual – 2nd Edition, 2003, page 1-21).

Strategies:

selection of service type

1. When exploring the introduction or expansion of transit service, agencies should consider a range of factors including:
   - population and demographic trends;
   - economic forecasts, future land use and travel patterns;
   - ridership forecasts;
   - funding availability;
   - parking management practices;
   - the potential impact of the new service type on community character and design; and
   - the impact of the transit service on the movement of other transportation modes.
2. For large centres with varying urban forms and densities, consider providing a family of transit services, ranging from bus rapid transit systems to community buses appropriate to the land use and travel patterns of individual communities (Guideline 1.2.2). These should be reviewed and augmented with higher levels of service and/or service types over time in response to increased ridership.

rural settlement areas

3. In rural *settlement areas*, where population densities are low and activity locations dispersed, a range of bus service options should be considered, including:
   - running shuttles, a limited bus service to key markets, such as areas with student or employee concentrations, in order to increase ridership and to keep costs low;
   - adding capacity through use of taxis or vans to provide shared rides, as a feeder service in outlying areas;
   - forming inter-municipal partnerships with neighbouring municipalities or larger municipalities/*regions* to provide more integrated service, or to purchase transit services;
   - offering community bus service with flexible routes, where customers can make a requested stop or request a scheduled pick-up. Vehicles may travel along defined routes or to defined stops, while making limited deviations to provide more customized service without incurring excessive schedule delays;
   - using fully demand-responsive services, such as dial-a-ride, that provide curb to curb service. This may be used in sparsely populated areas where trip patterns are unpredictable, or to serve the disabled community (Guideline 3.1.3).

Winnipeg Transit has developed the following standards for new route development and coverage:

- Introduce new routes or extend routes under these conditions:
  - When a new development has at least 600 housing units;
  - When most of the housing units in the new development are located more than 800 m from existing transit service; and
  - When at least 200 of the housing units in the new development are occupied.
- Establish express routes if:
  - it will result in significant reduction in travel time for customers; and
  - if all seats in the vehicle will be used at the maximum load point.
- For express routes, locate bus stops only at transfer points with other routes.

bus service

4. When considering establishing or extending a bus route, expanded coverage should be supported by sufficient ridership potential to keep service affordable. Use density thresholds in new developments to determine when new service should be introduced. *Geographic information system (GIS)* data may be used for spatial analysis of population and employment densities, as well as distribution of services and activities. See Guideline 1.1.7 for more on service in new developments.

5. Consider running a pilot test of a new or expanded route to test ridership potential and ridership needs before committing to new service. The pilot test should last 1-3 years, since it often takes new routes about this much time to achieve full ridership potential. Pilot tests should be monitored closely, for example, every 3 months to identify issues early and measure progress.

6. Monitor ridership along routes and route segments, and re-allocate service from low-demand routes to those with higher potential ridership. Restructure routes to accommodate new travel patterns or to improve efficiency by:
   - avoiding circuitous routes;
   - consolidating routes;
   - eliminating transfers.

7. BRT systems may be appropriate for communities where:
   - there is a *built-up* downtown core that facilitates concentrated service from outlying areas;
   - there are several developed downtown areas that require rapid transit connections between them;
   - there is an established reliance on existing transit and demonstrated new demand that will support high service frequencies of between 8 and 10 minutes during peak hours;
   - there are lower-density neighbourhoods with existing bus routes on either side of a *corridor* that could feed into the bus-way to reach community destinations;
   - current and projected levels of ridership may not support higher expenses associated with fixed rail service; and
   - route flexibility is required as BRT systems can operate without fixed rights-of-way.

higher order transit

8. LRT systems may be appropriate for communities where:
   - there are higher densities and a concentration of uses along a corridor capable of supporting bi-directional service;

A *feeder bus*, such as this one in Waterloo, picks up and delivers passengers to a rail rapid transit station or express-bus stop or terminal.

Light rail expansion in Portland, OR, has spurred the development of new residential neighbourhoods along the length of the route.

Recommended Resources

Case Study: Targeting Transit Service

Case Study: Right Sizing Transit Systems

The Canadian Transit Handbook, 3rd ed. – Chapter 3, Chapter 6, Chapter 7 (Canadian Urban Transit Association)

Transit Elasticities and Price Elasticities (Victoria Transport Policy Institute)

Transit Capacity and Quality of Service (Transit Cooperative Research Program)

Traveler Response to System Changes – Chapter 4, Chapter 5, Chapter 7, Chapter 8, Chapter 10 (Transit Cooperative Research Program)

Elements Needed to Create High Ridership Transit Systems – Chapter 4, Chapter 5 (Transit Cooperative Research Program)

- there are a number of major activity centres that could benefit from more efficient connecting transit service;
- levels of ridership suggest that multi-unit operation would result in higher service and labour productivity over running multiple individual buses; and
- there is a desire to leverage an investment in rapid transit to change development patterns and promote higher-density, transit-supportive environments.

9. Subway systems may be appropriate for communities where:
   - there are multiple major activity centres that would benefit from stronger transit connections;
   - existing and/or future levels of transit ridership are high enough to support subway service; and
   - existing levels of ridership are high and there are significant *redevelopment* opportunities along the route which could be triggered by an investment in a subway system.
10. Commuter rail services carry passengers from the lower-density suburbs or smaller municipalities to and from the city centre, typically in a radial network. These passengers travel longer distances, so vehicles offer more seating and less standing room. Commuter rail tends to have lower-frequency service, typically focusing on peak-hour travel in peak directions. Commuter rail vehicles also often share track rights-of-way with freight rail, which may cause delays.

ommunity context

11. Tailor different segments of a service to the community context of each segment by allowing buses to move from mixed traffic in areas of low congestion, to priority lanes and dedicated BRT facilities in areas where high congestion could impair transit travel time and reliability. Similarly, LRT services can be tailored to different community contexts by running alignments below grade through busy downtown cores, in mixed streets through residential or commercial areas, on dedicated lanes along busy arterials, or through parks and squares, as needed.
12. The need for an ideal, "typical" rapid transit cross section should not drive routing decisions. These should instead be based on the potential to attract and grow new ridership and the ability for new investments in transit to result in more transit-supportive environments.
13. Plan transit in a way that complements or enhances existing community form. Provide connections across dedicated transit rights-of-way, where appropriate, to prevent transit *infrastructure* from acting as a barrier within the community.

The MUNI system in San Francisco has been designed to operate within a variety of urban contexts throughout the city.

Recommended Resources (continued)

A Guide for Planning and Operating Flexible Public Transportation Services (Transit Cooperative Research Program)

Bus Rapid Transit: A Canadian Perspective (Canadian Urban Transit Association)

Rail Transit in Canada (Canadian Urban Transit Association)

Public Transit and Small Communities (Canadian Urban Transit Association)

Mobility Hub Guidelines (Metrolinx)

Transit Scheduling

3.1.2 Schedule vehicles to provide frequent service that meets local demand, minimizes passenger transfer waiting times and reduces overcrowding.

Transit scheduling can have a significant impact on the level of convenience and comfort experienced by travellers, minimizing wait times and reducing crowding on local services. In an environment where *transit* is in constant competition with other modes of transportation, adjusting the frequency of transit service can play an important role in affecting traveller mode choice. In many places, the automobile is often chosen over transit because it is more convenient and comfortable, can be taken at any time of the day, and always offers a guaranteed seat. Transit service, on the other hand, is often limited to certain hours of the day, and even during those hours may require the rider to adjust their personal schedule or accept a longer wait for a vehicle. Moreover, on busy routes, vehicles may be crowded, forcing many passengers to stand.

Timely and comfortable service with minimal transfers is critical to attracting and retaining riders. Scheduling frequent service during periods of high demand and minimizing transfer waiting time are important strategies for increasing transit ridership. Higher-frequency service can also result in increased vehicle capacity, increasing passenger comfort on crowded routes.

Bunching can delay vehicles and preclude any advantage that an increase in service might provide. Measures such as *signal priority* and *automatic vehicle location* can keep vehicles evenly spaced.

Strategies:

service level targets

1. Service level targets should be established, defining maximum vehicle ridership loads, wait times and transfer wait times. Different targets may be set for different vehicle types, geographic areas, seasons or times of day (peak or off-peak). They should reflect the transit agency's ridership growth plan, as well as the service goals outlined in regional and municipal transportation master plans.

expanding service

2. Service frequency or vehicle capacity (30-foot to 40-foot or articulated vehicles) should be increased if passenger counts exceed the transit agency's established maximum acceptable capacity. Capacity may be measured in terms of average number of customers on-board or percentage of seated capacity at the busiest period.

3. Bus bunching can arise due to a number of factors, such as traffic congestion or difficult road conditions. To avoid bus bunching, transit providers should consider implementing automatic vehicle location or conditional signal control and other transit priority measures (Guideline 2.2.5), especially when increasing service frequencies on routes with congestion or bad road conditions.

4. Extending or increasing service in the evenings may boost ridership during the daytime by capturing trips that start during the day, but return late in the evening.

facilitating transfers

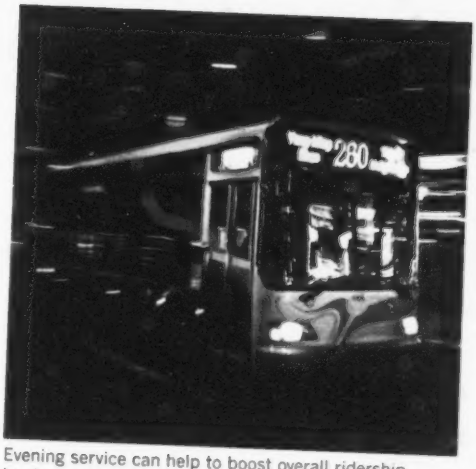
5. Coordinate services and timetables between operators' connecting routes when regular service changes are planned.

6. Where multiple services are being coordinated at a transit *node*, focus coordination efforts on routes that are most heavily used and where transfers are common. Arrival of the first service should occur within 10 minutes or less of the departure of the connecting service, while still allowing enough time for passengers to transfer and accommodating late-running vehicles.

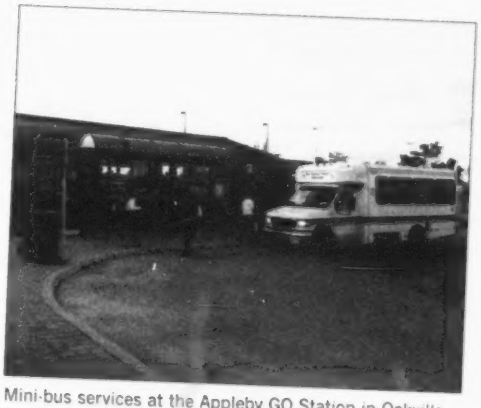
7. Connections for services with high regular demand that serve a key destination should be scheduled for wait times of 5 minutes or less between the first service and the connecting service.

service review

8. Develop a regular program of route reviews to evaluate a route's service quality and set targets for service levels, frequency, overcrowding and transfer wait times. See more on performance monitoring in Guideline 3.2.1.



Evening service can help to boost overall ridership levels, enabling riders to take transit during the day and return via transit in the evening.



Mini-bus services at the Appleby GO Station in Oakville are coordinated with train arrival times to provide convenient, quick transfers for passengers heading to dispersed local businesses.

Route Service Frequencies

Service Span	Service Frequency (minutes)				
	VIVA Routes	Base Grid	Local Routes	Community Bus (Base)	Community Bus (Other)
Weekdays					
6:00 to 9:00 am / 3:00 to 7:00 pm	15	20	30	60	60
9:00 am to 3:00 pm / 7:00 to 11:00 pm	15	30	60	120	120
Saturdays					
6:00 am to 11:00 pm	15	30	60	120	120
Sundays/Holidays					
9:00 am to 11:00 pm	15	60	60	120	120

Note: Span of service standard applies only to Base Services

The decision to operate a service other than a Base Route in any period is subject to achieving minimum performance requirements.

Clock face headways are included as a service guideline for any route operating with frequency wider than 10 minutes.

Vehicle Loading Standards

Route Type	Average Maximum Vehicle Load
BASE, LOCAL AND EXPRESS ROUTES	
60-foot Bus (Viva)	72 passengers per vehicle
40-foot Bus	55 passengers per vehicle
40-foot Bus Viva Bus	48 passengers per vehicle
35-foot Bus	48 passengers per vehicle
30-foot Bus	40 passengers per vehicle
EXPRESS ROUTE	
(high-speed or highway)	100% of seating capacity per vehicle
SHUTTLE	100% of seating capacity per vehicle
COMMUNITY BUS	
Peak Period	100% of seating capacity over maximum 60 minutes
Off-peak Period	100% of seating capacity over a 60-minute period

Base, Local and most Express loads are based on average maximum passengers per vehicle at the peak point of the route, measured over the peak 60 minute period.

York Region Transit's Service Frequency and Vehicle Loading Standards establish targets to evaluate the ridership loads and wait times. York Region Transit's Service Frequency and Vehicle Loading Standards vary based on the type of transit service. Bus rapid transit VIVA Routes have frequent and limited stops. Base grid routes are available 7 days per week on all major east-west and north-south arterials. Local routes serve as feeder or neighbourhood circulation that feeds to the *grid network* and community buses provide dial-a-ride service.

9. Performance data and observations should be compared to established service levels. Connection wait time data may be obtained from *electronic fare payment (EFP)* systems, while ridership load data for routes and route segments may be obtained from:

   - manual counts;
   - automated passenger counts;
   - EFP systems;
   - passenger surveys;
   - observations from operating staff; and
   - customer complaints and suggestions.

reducing service

10. If demand does not support the minimum frequency, decrease frequency or vehicle capacity, and invest operating savings on other routes in need of service improvements. However, transit systems should be aware that reducing service frequency may further reduce ridership. To maintain ridership, operators should set a minimum frequency standard for routes regardless of demand.

11. Evaluate service changes regularly to ensure there is customer benefit. Recognize that customers perceive each component of a transit trip differently, so not all improvements are equally beneficial. For example, time spent waiting at a stop is considered more onerous than time spent on a moving vehicle.

Winnipeg Transit's Maximum Seated Capacity Practice

Weekday Peak: 150%

Off-Peak: 100%

Winnipeg Transit establishes service target levels based on different periods of the day. While off peak the standards aim to ensure that everyone can get a seat, during peak periods the standards are based on an assumption that it is acceptable for up to 1/3 of riders on each bus to have to stand.

Recommended Resources

The Canadian Transit Handbook, 3rd ed. – Chapter 6 (Canadian Urban Transit Association)

Traveler Response to System Changes – Chapter 9 (Transit Cooperative Research Program)

Transit Scheduling: Basic and Advanced Manuals (Transit Cooperative Research Program)

Elements Needed to Create High Ridership Transit Systems – Chapter 5 (Transit Cooperative Research Program)

Examples of Maximum Load Capacity:

Maximum numbers of riders on Toronto Transit Commission Vehicles

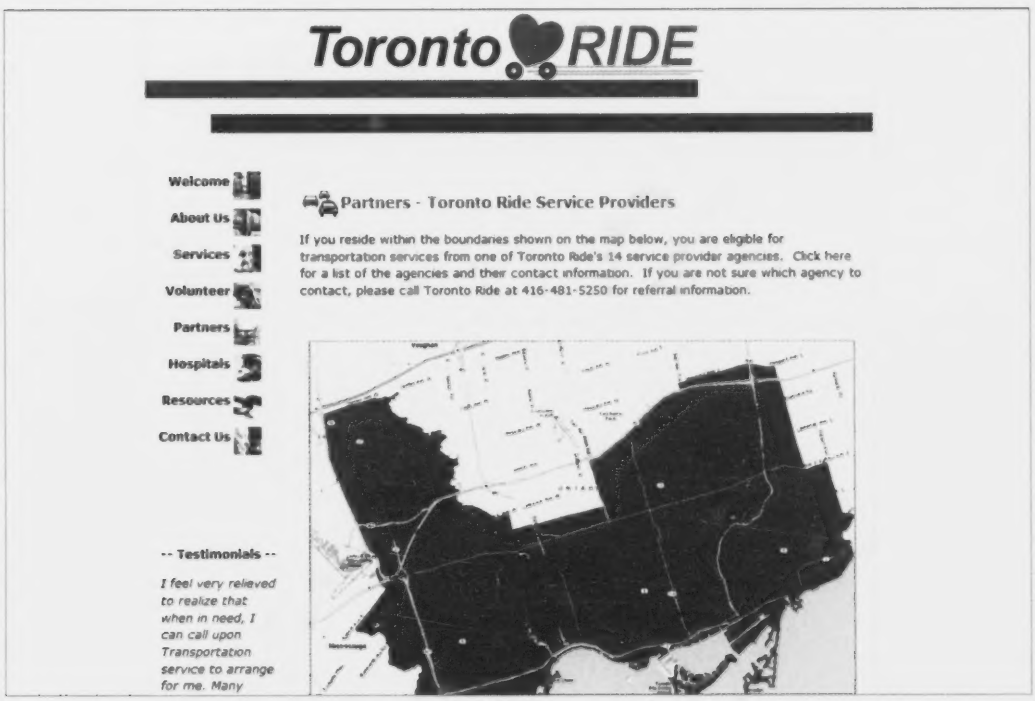
Type of Vehicle	Peak period Any frequency	Off-peak – once every 10 min or more frequent	Off-peak – less frequent than once every 10 min
40 foot bus-non accessible	57	49	39
40 foot bus accessible	57	45	36

Demand–Responsive Transit Services

3.1.3 Provide demand-responsive transit services for people who cannot use conventional fixed-route, fixed-schedule transit or to serve areas where conventional transit cannot be efficiently provided.

Demand-responsive transit refers to transit services with no formal designated routes or schedules. Instead, customers are picked up and dropped off at locations and times that are agreed upon by the customer and the transit agency. Transit providers may provide advance reservation for pick-ups and drop-offs, regular pre-arranged trips (subscription service) or same-day requests for service. Flexible transit systems are a variation of demand-responsive systems, where a main route or series of stops is designated, but deviations are permitted to respond to customers' specific requests.

Demand-responsive and flexible transit may be more efficient alternatives where low population densities exist, or where trip-making is low during certain times. Demand-responsive service with fully accessible vehicles is essential to providing *specialized transit* for persons with disabilities and others who are not able to use conventional *transit*. This section describes strategies for improving operations of flexible and demand-responsive transit services. The Accessible Transportation Standard under the Accessibility for Ontarians with Disabilities Act will also require service improvements to specialized transit. Accessibility improvements for conventional transit are described in Guideline 3.4.1 of the document.



In 1998, fourteen Community Support Service agencies formed a partnership called Toronto Ride to provide *community transportation* services for seniors to healthcare appointments, programs such as adult day services, social outings and shopping. The agencies share resources to meet unmet rides by posting unmet rides on a shared information system and picking up rides as they are able according to a Memorandum of Understanding and Standard Operating Terms agreed on by its members. Approximately 185,000 rides are provided to about 5,000 clients annually.

Strategies:

assessing demand

1. Examine demographic and population characteristics along with patterns of land use to determine whether flexible or demand-responsive transit could be implemented to serve areas (or periods) with few trips, or riders with special mobility needs.

enhancing access

2. Subscription services such as *vanpools* or shuttle services may be provided to riders making trips on a regular schedule.
3. Advance reservation systems should be used to organize and cluster trips at certain times for cost efficiency.
4. To improve the usability of flexible and demand-responsive transit services, transit agencies should consider:
   - expanding reservation hours, reducing required pre-booking time or allowing reservations for multiple trips;
   - introducing same-day service;
   - introducing online trip booking or improving telephone booking, (e.g. decrease call hold time);
   - developing an interactive telephone system; and
   - working with employers to match services with schedules.

community outreach

5. Community access to information can be improved by:
   - providing user-friendly online, telephone or paper information that provide general information, booking information, other service policies, etc;
   - providing *real-time trip planning information* and arrival times to customers and informing clients of delays;
   - offering information and education programs in collaboration with health care providers, senior citizen facilities, social services agencies, shopping centres, etc.; and
   - posting information on Dial-a-Ride and contact phone numbers on bus stop signs and at transit stations.
6. Community outreach can be enhanced by providing forums for dialogue with the community and advocacy groups.

ordinating service

7. Consider expanding the service area by improving inter-municipal trips and coordinating a common service policy, including harmonized hours, routes, transfer points and timing.
8. All public transportation services within a community should be coordinated to expand or provide more efficient transit service. This can include coordination between conventional or specialized transit agencies; long-term care agencies; social service agencies; hospitals, ambulance and patient transfer operators; school boards and school bus companies; intercity bus companies; taxi operators; and volunteer groups.
9. The level of coordination between agencies should be tailored to local conditions, and can include shared public information or referral, joint acquisition and sharing of supplies and services, use of excess capacity, joint use of resources, and centralized services for intake and dispatch.

North Bay's Dial-a-Cab Service

North Bay Transit serves about 50,000 people, providing about 45 rides per capita in 2003 with a 57% cost-recovery ratio. To minimize operating costs it offers a flexible dial-a-cab service in some areas of North Bay where fixed-route service does not make financial sense. Cab rides connect riders to bus routes. Riders who are travelling to or from dial-a-cab areas call the dispatcher to inform her/him of the bus stop they will be waiting at and at what time. Taxi pick up is coordinated with bus schedule times. Riders pay an additional $5.00.

Dial-a-Cab Service (City of North Bay)

Recommended Resources

Case Study: Rural Transit

A Guide to Preparing a Ridership Growth Plan (Ontario Ministry of Transportation)

The Canadian Transit Handbook, 3rd ed. - Chapter 3, Chapter 6 (Canadian Urban Transit Association)

Access ON (Ontario Ministry of Community and Social Services)

Public Transit and Small Communities (Canadian Urban Transit Association)

Traveler Response to System Changes - Chapter 5, Chapter 6 (Transit Cooperative Research Program)

Toolkit for Integrating Non-Dedicated Vehicles in Paratransit Service (Transit Cooperative Research Program)

Guidebook for Rural Demand-Response Transportation: Measuring, Assessing, and Improving Performance (Transit Cooperative Research Program)

A Guide for Planning and Operating Flexible Public Transportation Services (Transit Cooperative Research Program)

Transit Travel Time

3.1.4 Minimize the impacts of travel delays by implementing transit priority measures, more efficient boarding procedures, and computer-aided dispatching.

Congestion, variable dwell times and unexpected incidents can cause transit travel times to be slow and unpredictable, making *transit* less attractive to travellers who will naturally compare travel times against those of private vehicle users. Vehicles that travel in (or cross through) mixed traffic, such as buses, *bus rapid transit* (BRT), *light rail transit* (LRT) or streetcars, are susceptible to these delays. Vehicle dwell times at stops and stations are another source of variable and unpredictable delay.

The travel time uncertainty of these delays is often exacerbated by bunching of vehicles. This happens when delayed vehicles pick up more passengers and experience increasing dwell times. Fewer passengers are then left for the next transit vehicle, which thus experiences shorter dwell times and eventually catches up to the delayed vehicle.

By providing transit priority in mixed traffic conditions, such as dedicated lanes, *queue jump lanes* or *signal priority*, transit travel time can be reduced, and travel time reliability can be improved. This can be particularly effective and have the greatest impact in areas of existing congestion. Measures to speed up boarding times such as efficient fare payment systems can also improve travel time while *computer aided dispatch (CAD)* and *automatic vehicle locator (AVL)* systems can improve response to vehicle delays, collisions and breakdowns.

Pre-pay boarding facilities, such as this example in London, can greatly shorten boarding time for passengers.

Strategies:

transit priority in mixed traffic

1. Dedicated lanes and *high occupancy vehicle (HOV)* lanes give transit vehicles a clear route to bypass congestion. If a continuous dedicated lane is not available, right-turn lanes may be used as queue jump lanes for buses, so that they may reach intersections or bus stops more quickly. Buses in queue jump lanes should be provided a priority signal to proceed ahead of the regular traffic stream (Guideline 2.2.5).
2. Consider setting signal timing plans to suit transit schedules and travel speeds. This strategy is referred to as "passive signal priority".
3. Active signal priority, where traffic signals are activated by a street-located sensor or by an in-vehicle transmitter, may be implemented. The priority logic may consider transit vehicle schedule adherence, for example, providing priority only for transit vehicles that are behind schedule, or may be implemented only at certain times or for certain routes, such as express routes. Signal timing plans may also be optimized to consider real-time general traffic conditions.

boarding efficiency

4. Allowing passengers to board and alight through multiple doors can greatly shorten passenger boarding times. To enable this, a *proof-of-payment* system must be in place so that the driver is not required to collect and inspect fares, transfers and passes for users that enter through rear doors.
5. Boarding efficiency may be improved by implementing *electronic fare payment (EFP) systems*, which reduce fare handling requirements of the driver. EFP also reduces fare evasion.
6. Low-floor vehicles can reduce dwell times and improve travel times by enabling passengers to board more quickly.
7. Consider implementing precision docking technology to enable vehicles to align themselves in the correct position at stops and stations. The vehicle doors will open at the same place every time, so passengers can align themselves correctly and thus speed up boarding. At stations with platforms, a level, gap-free alignment will allow for direct wheelchair access from the loading platform (without a ramp).
8. Where appropriate, increase the distance between stops by consolidating stops or providing limited-stop or express service to increase bus travel speeds, and to improve passenger comfort by reducing the amount of acceleration and deceleration required. This strategy should be balanced against longer travel distances to stops, as well as longer dwell times resulting from more passengers boarding and alighting at each stop. Locating bus stops at the far side of the intersection allow buses to move through a green signal speeding up travel time.

responding to delays

9. Consider using a CAD system with AVL to enable dispatchers and supervisors to monitor and respond to delays, improving schedule adherence, and protecting transit connections.

Multiple-door boarding found in proof-of-payment systems allows for quicker boarding times.

Grand River Transit's iXpress is a limited-stop express bus service. By limiting the number of stops to 13 stations along a 33 km corridor, the system is able to provide a convenient, efficient service connecting the centres of Waterloo, Kitchener and Cambridge.

Recommended Resources

Case Study: Mid-Sized Community Transit

Case Study: Growing Transit Ridership

A Guide to Preparing a Ridership Growth Plan (Ontario Ministry of Transportation)

The Canadian Transit Handbook, 3rd ed. - Chapter 14 (Canadian Urban Transit Association)

Arterial HOV Facilities in Canada (Canadian Urban Transit Association)

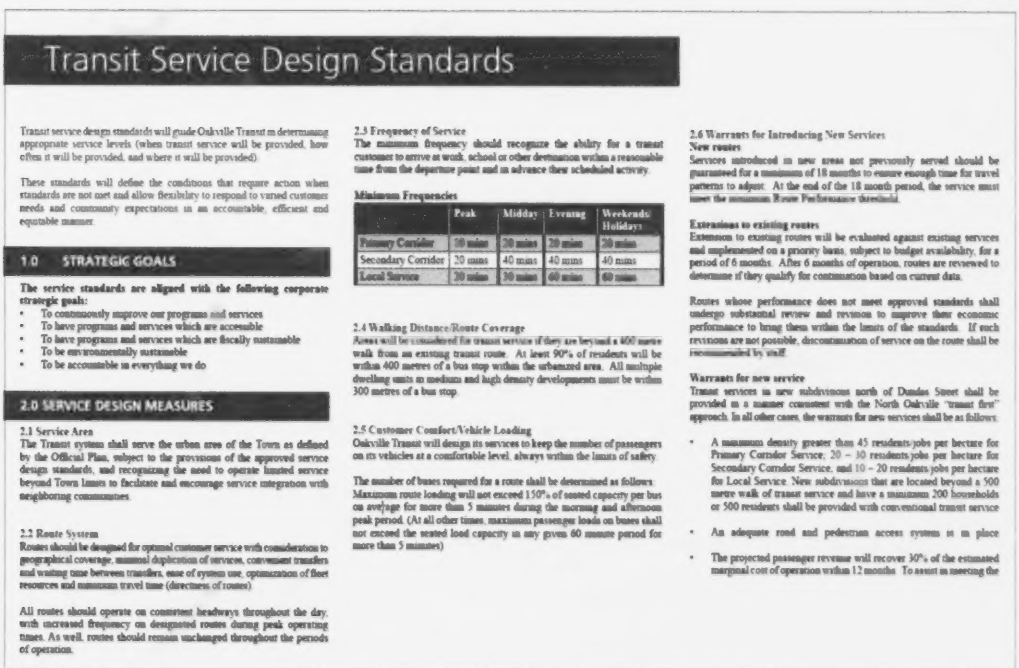
Traveler Response to System Changes - Chapter 2 (Transit Cooperative Research Program)

Performance Monitoring and Evaluation

3.2.1 Implement a performance monitoring plan to review trends and progress in achieving ridership and service targets, and develop a plan and for meeting new targets.

Performance monitoring allows transit agencies to determine whether they are meeting their ridership and quality of service targets, allowing them to improve service efficiency, availability, comfort and convenience. It is essential for transit agencies to be aware of the quality of service being provided, as well as the quality of service as perceived by riders (and non-riders), so that agencies may develop strategies to attract and retain ridership. Without a systematic approach to monitoring performance, transit agencies will not know whether they are meeting ridership and service quality targets, or whether problems and gaps in service exist.

A performance monitoring plan is necessary to establish which measures will be used to evaluate how well ridership and service quality targets have been achieved. Performance monitoring is also integral to the development of service plans – a program of service improvements to guide transit agencies in achieving goals, such as ridership growth.



Transit Service Design Standards

Transit service design standards will guide Oakville Transit in determining appropriate service levels (when transit service will be provided, how often it will be provided, and where it will be provided).

These standards will define the conditions that require action when standards are not met and allow flexibility to respond to varied customer needs and community expectations in an accountable, efficient and equitable manner.

1.0 STRATEGIC GOALS

The service standards are aligned with the following corporate strategic goals:

- To continuously improve our programs and services
- To have programs and services which are accessible
- To have programs and services which are fiscally sustainable
- To be environmentally sustainable
- To be accountable in everything we do

2.0 SERVICE DESIGN MEASURES

2.1 Service Area
The Transit system shall serve the urban area of the Town as defined by the Official Plan, subject to the provisions of the approved service design standards, and recognizing the need to operate limited service beyond Town limits to facilitate and encourage service integration with neighboring communities.

2.2 Route System
Routes should be designed for optimal customer service with consideration to geographical coverage, minimal duplication of services, convenient transfers and waiting time between transfers, ease of system use, optimization of fleet resources and minimum travel time (directness of routes).

All routes should operate on consistent headways throughout the day, with increased frequency on designated routes during peak operating times. As well, routes should remain unchanged throughout the periods of operation.

2.3 Frequency of Service
The maximum frequency should recognize the ability for a transit customer to arrive at work, school or other destination within a reasonable time from the departure point and in advance their scheduled activity.

Minimum Frequencies

	Peak	Midday	Evening	Weekends/ Holidays
Primary Corridor	20 mins	20 mins	20 mins	20 mins
Secondary Corridor	20 mins	40 mins	40 mins	40 mins
Local Service	30 mins	30 mins	60 mins	60 mins

2.4 Walking Distance/Route Coverage
Areas will be considered for transit service if they are beyond a 400 metre walk from an existing transit route. At least 90% of residents will be within 400 metres of a bus stop within the urbanized area. All multiple dwelling units in medium and high density developments must be within 300 metres of a bus stop.

2.5 Customer Comfort/Vehicle Loading
Oakville Transit will design its services to keep the number of passengers on its vehicles at a comfortable level, always within the limits of safety.

The number of buses required for a route shall be determined as follows: Maximum route loading will not exceed 150% of seated capacity per bus on average for more than 5 minutes during the morning and afternoon peak period. (At all other times, maximum passenger loads on buses shall not exceed the seated load capacity in any given 60 minute period for more than 5 minutes)

2.6 Warrants for Introducing New Services
New routes
Services introduced in new areas not previously served should be guaranteed for a minimum of 18 months to ensure enough time for travel patterns to adjust. At the end of the 18 month period, the service must meet the minimum Route Performance threshold.

Extensions to existing routes
Extension to existing routes will be evaluated against existing services and implemented on a priority basis, subject to budget availability, for a period of 6 months. After 6 months of operation, routes are reviewed to determine if they qualify for continuation based on current data.

Routes whose performance does not meet approved standards shall undergo substantial review and revision to improve their economic performance to bring them within the limits of the standards. If such revisions are not possible, discontinuation of service on the route shall be recommended by staff.

Warrants for new service
Transit services in new subdivisions north of Dundas Street shall be provided in a manner consistent with the North Oakville "transit first" approach. In all other cases, the warrants for new services shall be as follows:

- A minimum density greater than 45 residents/jobs per hectare for Primary Corridor Service; 20 – 30 residents/jobs per hectare for Secondary Corridor Service, and 10 – 20 residents/jobs per hectare for Local Service. New subdivisions that are located beyond a 500 metre walk of transit service and have a minimum 200 households or 500 residents shall be provided with conventional transit service
- An adequate road and pedestrian access system is in place
- The projected passenger revenue will recover 30% of the estimated marginal cost of operation within 12 months. To assist in meeting the

In 2008, Oakville developed a plan for service improvements by setting strategic goals and devising service standards to meet those goals. The plan was posted for public comment.

Strategies:

setting goals

1. Set agency goals for the transit system defining what the agency wants to achieve over a specific period of time. For example, goals may be related to ridership growth, modal share, system capacity, service reliability, service comfort, universal access or farebox revenues. Goals should be based on the agency's ridership growth plan, as well as other relevant plans, such as official plans, transportation master plans or plans to achieve universal accessibility.
2. Establish annual plans and targets and a program of improvements that will help the transit agency realize its long-term goals.

performance measures

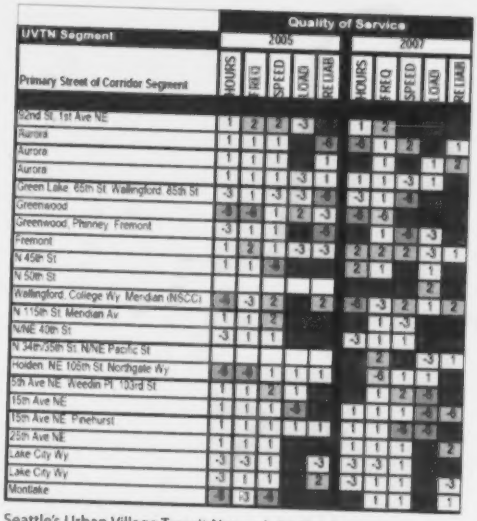
3. Use performance measures to assist in decision-making. Based on the trends revealed by the measures, the effectiveness of different strategies in meeting ridership and service targets can be evaluated and new strategies can be designed.
4. Select performance measures or indicators that will demonstrate progress in meeting the defined targets, and are adapted to the needs of different users. The Ontario Guide to Preparing a Ridership Growth Plan and the Canadian Urban Transit Association (CUTA) provide lists of possible performance indicators for both conventional and *specialized transit* services. Quantifiable measures are desirable if possible, but should be supplemented with qualitative or descriptive measures to get a deeper understanding of rider (and non-rider) sentiment and travel needs.
5. Identify who will use the performance measures and the users' needs to better understand how performance data will be used. For example, measures may be used by financial management to determine budgets and expenditures, by operational staff to monitor and improve service, or by transit marketing staff to establish promotional materials and campaigns.

data collection

6. Select performance measures that are appropriate for the agency's ability and resources to collect and analyze the data. Measures should be realistic and correspond to an agency's capacity to collect the data regularly. See Guideline 3.2.2 for more information on data collection.

monitoring plan

7. Establish a regular schedule for performance monitoring and reporting, as well as a methodology for collecting data and a process for validating each performance measure.
8. Public and political consultation should be included in the performance monitoring process for service planning and programming of service improvements (Chapter 4).
9. A review of the performance measurement program should be undertaken at least every five years to update performance targets and measures as services are adjusted and improved. Consider evaluating results of performance through a peer review process with other transit agencies.



UVTN Segment	Quality of Service									
	2005					2007				
Primary Street of Corridor Segment	HOURS	FREQ	SPEED	LOAD	RELIAB	HOURS	FREQ	SPEED	LOAD	RELIAB
92nd St, 1st Ave NE	1	2	2	-3		1	2			
Aurora	1	1	1		-3	-3	1	2		1
Aurora	1	1	1		1		1		1	2
Aurora	1	1	1	-3	1	1	1	-3	1	
Green Lake, 85th St, Wallingford, 85th St	-3	1	-3	-3	-3	-3	1	-3		
Greenwood	-3	-3	1	2	-3	-3	-3			
Greenwood, Phinney, Fremont	-3	1	1		-3		1	-3	-3	
Fremont	1	2	1	-3	-3	2	2	2	-3	1
N 45th St	1	1	-3			2	1		1	
N 50th St									2	
Wallingford, College Wy, Meridian (NSCC)	-3	-3	2		2	-3	-3	2	1	2
N 115th St, Meridian Av	1	1	2				1	-3		
N/NE 40th St	-3	1	1			-3	1	1		
N 34th/35th St, N/NE Pacific St							2		-3	1
Holden, NE 105th St, Northgate Wy	-3	-3	1	1	1		-3	1	1	
5th Ave NE, Weedin Pl, 130rd St	1	1	2	1			1	2	-3	
15th Ave NE	1	1	1	-3		1	1	1	-3	-3
15th Ave NE, Pinehurst	1	1	1	1	1	1	1	-3	-3	
25th Ave NE	1	1	1			1	1	1		2
Lake City Wy	-3	-3	1		-3	-3	-3	1		
Lake City Wy	-3	1	1		2	-3	1	1		-3
Montlake	-3	-3	-3				1	1		1

Seattle's Urban Village Transit Network (UVTN) Report Card contains performance data on all classifications of UVTN corridors. The Report Card is updated every few years in order to see how they are achieving their goals. In this table highlighting levels of transit service, +3 represents "best performance" -9 represents "worst performance".

Recommended Resources

Case Study: Growing Transit Ridership

A Guide to Preparing a Ridership Growth Plan (Ontario Ministry of Transportation)

The Canadian Transit Handbook Chapter 11 (Canadian Urban Transit Association)

Best Practices in Transit Service Planning (Florida Department of Transportation)

Best Practices for the Technical Delivery of Long-Term Planning Studies in Canada, Section 3.5 (Transportation Association of Canada)

A Guidebook for Developing A Transit Performance Measurement System (Transit Cooperative Research Program)

Guidebook for Rural Demand-Response Transportation: Measuring, Assessing, and Improving Performance (Transit Cooperative Research Program)

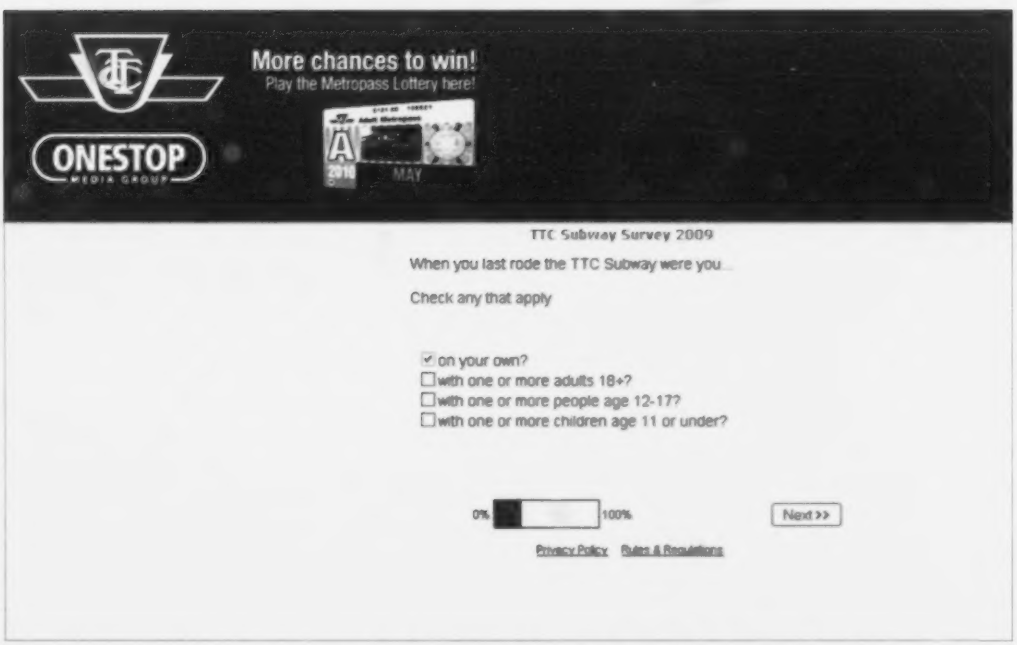
Five-Year Service Plan (York Region)

Data Collection and Analysis

3.2.2 Implement a data collection and analysis program to support planning and promotional activities.

A data collection and analysis program provides quantitative and qualitative measures required by the transit agency's performance monitoring program. This information can be used to measure the transit agency's performance, and to develop service improvement and promotional plans. There are a number of means to collect data and information. A valuable source of data comes from *intelligent transportation systems (ITS)*. These are often implemented to support operations, fare payment or other functions, but can be used for planning and performance monitoring. Another valuable source on transit data collection and analysis is the Ontario Urban Transit Fact Book, which defines and collects transit operating data from across Ontario, and can be used as the basis for a transit system's performance monitoring program.

Where ITS technologies are not available, ridership data can be obtained through manual counts or assessment of fare revenues. Service quality information can be obtained through surveys, interviews, focus groups, consumer panels, operator observations, service audits or customer feedback.



Online surveys such as in the above example can help to provide data and information on ridership demand, attitudes and quality of service. Source: Toronto Transit Commission

Strategies:

determining data needs

1. Agencies should determine their data and analysis needs based on their performance monitoring plan (Guideline 3.2.1), and the agency's ability and resources to collect and analyze the required data. Next, determine technologies and methods to collect data. If the technology is not available, the costs and benefits of procurement should be weighed.
2. Involve data users early in the data collection and analysis process to ensure the results are more useful to market researchers, operations planners and other ultimate users.
3. Data and information on ridership demand, attitudes and quality of service can be obtained through surveying riders and the general public. Attitude surveys determine the transit's service quality as experienced by riders. Ridership surveys can help determine trip characteristics, on time performance, or service delays.
4. ITS data can be used to enhance traditional market research methods, such as customer surveys, market surveys and focus groups. Passenger data from ITS technologies can be used to define sampling plans, establish sampling weights or expansion factors, determine the best time to sample, and identify times and locations for recruiting focus group participants.

ridership

5. Determine a definition for ridership based on your agency's needs. Ridership can be the number of boardings on a transit vehicle, the number of paying passengers or number of completed transit trips. Consult with such organizations as CUTA or other transit agencies for methodologies.
6. When calculating ridership for conventional transit, an agency should consider developing a standardized process that accounts for transit pass use, farebox revenue, transfers and tickets used.

demand-responsive transit

7. For demand-responsive transit, verify ridership reports with driver manifests and reviewing processes accounting for add-ons, late cancellations and no shows.

data management

8. To maximize the usefulness of the data across the entire transit agency, a system for data management should be established. In addition to storing the archived ITS data, it could also include customer survey and interview data, parking lot usage surveys, *geographic information system (GIS)* visualizations, aerial photography, census boundary information, census data, zoning data, buildings and geographic features.
9. Agencies should plan for data validation and management. Manual surveys and ITS technologies produce a large amount of information, and each new data set must conform to an established data model and be validated before being incorporated into the data warehouse.

Using ITS to support data collection

Automatic Vehicle Location (AVL) data can be used to monitor vehicle travel time and reliability, observe where dwell times are long, and determine where priority treatments such as *queue jump lanes* or signal priority might improve schedule or headway adherence.

Automatic Passenger Count (APC) data can assist in understanding rider origins and destinations, and ridership by route, route segment and time of day. This can be used to adjust service capacity and routes, and to monitor ridership during special promotions or to special events. It can also be used to determine at which stops and stations to locate advertisements and print information, and to prioritize upgrades.

Electronic Fare Payment (EFP) data can show travellers' trip and trip-chaining behaviour, as well as weekly and monthly travel patterns. This allows customer groups to be identified, and can also be used to confirm stated preferences with observed behaviour, and thus to understand and validate the results of interviews and surveys.

Automatic Vehicle Monitoring (AVM) systems can be used monitor mechanical events, such as vehicle breakdowns, and their impact on quality of service.

Transit Agency Web Pages can be used to track the web pages viewed and travel itineraries queried, so transit agencies can obtain information about their customers.

Recommended Resources

The Canadian Transit Handbook, 3rd ed. – Chapter 5 Marketing (Canadian Urban Transit Association)

Canadian Urban Transit Fact Book (published by CUTA on behalf of Ontario Ministry of Transportation)

Leveraging ITS Data for Transit Market Research (Transit Cooperative Research Program)

New Technologies

3.2.3 Establish a long-range technology implementation plan that coordinates short-term prioritized projects with longer-term planning in a way that maximizes benefits across the entire agency.

New technologies can dramatically improve a transit agency's efficiency and safety; however, implementation of new technologies must be handled in a planned, coordinated way to maximize their benefits across the agency. If the implementation of different technologies is not coordinated, the benefits may be limited and additional costs incurred.

New technologies represent a major financial investment for transit agencies, but also have the potential to provide significant operational savings and service improvements. *Intelligent transportation system (ITS)* technologies can enhance many different aspects of transit service, and new technologies are continually being developed. Because technologies have a relatively short shelf life, transit agencies should implement individual elements as short projects, so that benefits can be realized quickly. Each technology implementation project should, however, be coordinated as part of a prioritized plan that maximizes the benefits of each investment. The technology implementation plan should also consider institutional, technical, financial and operations- and maintenance-related barriers, which can drastically reduce the benefits of the technology.

Core Technology	Transit Mode						
	Fixed Route Bus	Demand Response	Rural Transit	Human Service	Rail Transit	Ferry Boat	Total Modes
Automatic Vehicle Location	●	●	●	●	●	●	6
Communications	○	○	○	○	○	○	6
Traveller Information	●	●	●	●	●	●	6
Data Management – GIS	○	○	○	○	X		4
Computer-Aided Dispatch & Scheduling	●	●	●	●			4
Maintenance Tracking	○	○		○	○		4
Electronic Fare Payment	●	●	X	●	X	X	3
Security Cameras/System	○		○		○		3
Weather Information System					●	●	2
Advanced Passenger Counters	○				X		1
Traffic Signal Priority	X				●		1

● Core Technology

○ Secondary Technology after Core is deployed

Source: Adapted from US DOT FTA

The applicability of new technologies will vary depending upon the scale and mode of transit service being provided.

Strategies:

planning for technology

1. Develop a coordinated, agency-wide technology plan that prioritizes capital investments as well as associated human resources development. Involve all stakeholders at the planning stage, and clearly communicate the benefits of the plan in advance of upgrades.
2. Next, develop strategic project plans. Consider the following key strategies:
   - using standards for interoperability of technologies, such as ITS Canada's National ITS Architecture and TCP/IP protocols when implementing communications and technology systems;
   - implementing small projects incrementally, allowing benefits to be realized sooner;
   - planning for system upgrades, as technology changes quickly; and
   - involving operations and maintenance staff who will be responsible for operating and maintaining the technology early in the planning process.
3. Identify a senior-level technology champion who can articulate and promote the vision and benefits of the technology to various stakeholders.
4. Be creative in developing revenue opportunities to fund transit assets and technology, such as public-private partnerships and pooling resources among agencies.

aintenance

5. Develop a plan for recruitment, training and retention of personnel with the technical skills to support, maintain and utilize the new technology. A technical support agreement should be in place with technology vendors and/or the agency should develop the necessary expertise in-house.
6. Develop a system for reporting, tracking and resolving problems during technology implementation and operation. Use the information to determine additional technology needs, and to improve future technology implementation projects.

New technologies such as automatic fare payment systems can speed up boarding time and calculate the lowest fare applicable to the customer.

Recommended Resources

Synthesis on Automatic Vehicle Location (AVL) Systems (Transit Cooperative Research Program)

Leveraging ITS Data for Transit Market Research (Transit Cooperative Research Program)

Core Technology Fact Sheet (US Department of Transportation)

Intelligent Transportation Systems: A Smart Future for Transit (Canadian Urban Transit Association)

Asset Management

3.2.4 Develop an asset management plan that considers the life cycle costs of all physical assets, including vehicles, facilities, *infrastructure*, office equipment, technology and other assets, required to meet the agency's service and ridership targets.

Transit agencies rely on a range of physical assets to provide convenient, reliable and comfortable service. As these assets age, they require maintenance and replacement. New assets may also be required to meet system growth and other changes. Without an asset management plan, a transit agency may be unprepared for the costs of maintaining and purchasing assets, and critical assets might fail. The agency might then be unable to provide its target level of service, and this can affect ridership levels.

A clear asset management plan will improve the transit agency's ability to meet the required service and ridership targets in the most cost-effective manner, or to meet new requirements, such as the Province's plans for fully accessible transit vehicles and services. The Province has developed a Guide to Preparing an Asset Management Plan – this section presents some of the key recommendations from that guide.

An asset management plan can account for the lifecycle costs of a range of physical assets such as computers or control systems that are critical to the operation of the transit system.

Strategies:

determining needs

1. By identifying the agency's assets and determining the risks and consequences of their failure, a cost-effective long-term strategy can be developed for providing a defined level of service and accommodating growth through *transportation demand management* (Guideline 3.5.5) and infrastructure investment. Agencies should determine the level of service and asset condition required to meet the following objectives:
   - the service quality and ridership targets defined by the ridership growth plan;
   - the demand forecasted by the municipal official plan and the ridership growth plan;
   - regulatory requirements (safety, environmental, etc.);
   - broader regional and municipal objectives;
   - accommodating specific markets based on demographic outlook;
   - improving the transit system's performance; and
   - maximizing returns on investments on a life-cycle basis.
2. Agencies should establish an inventory of current assets, including vehicles, facilities, infrastructure, office equipment, technology and other assets. Once an inventory has been completed, an assessment should be made of their current condition, remaining useful life, and their ability to meet the required level of service. This should be used to determine which assets are critical, and estimate the likelihood, consequences and costs of their failure.

prioritizing investments

3. Develop a prioritized capital investment plan and an associated operations and maintenance plan that will provide the level of service required. For example, in the case of rail-based systems, estimate the number of vehicles, expected mileage, number of stops, stations and depots, as well as track and wayside equipment required. The expected preventive and corrective maintenance associated with each asset should also be estimated.
4. Develop a financial plan to fund the capital investment and operations and maintenance plans. These plans should consider life cycle costs and depreciation, and could consider the full costs and benefits of the various types of asset ownership, from full public ownership, to leased vehicles to public-private partnerships.
5. Select enterprise asset management software that meets the agency's needs. For smaller agencies, a basic spreadsheet program may be enough, while for larger organizations, it is beneficial to implement a tool and framework to track and plan the assets, operations and maintenance, and to store and distribute data.

Poor maintenance and life cycle management can lead to system failures that create inconveniences for passengers.

Recommended Resources

A Guide to Preparing aTransit Asset Management Plan (Ontario Ministry of Transportation)

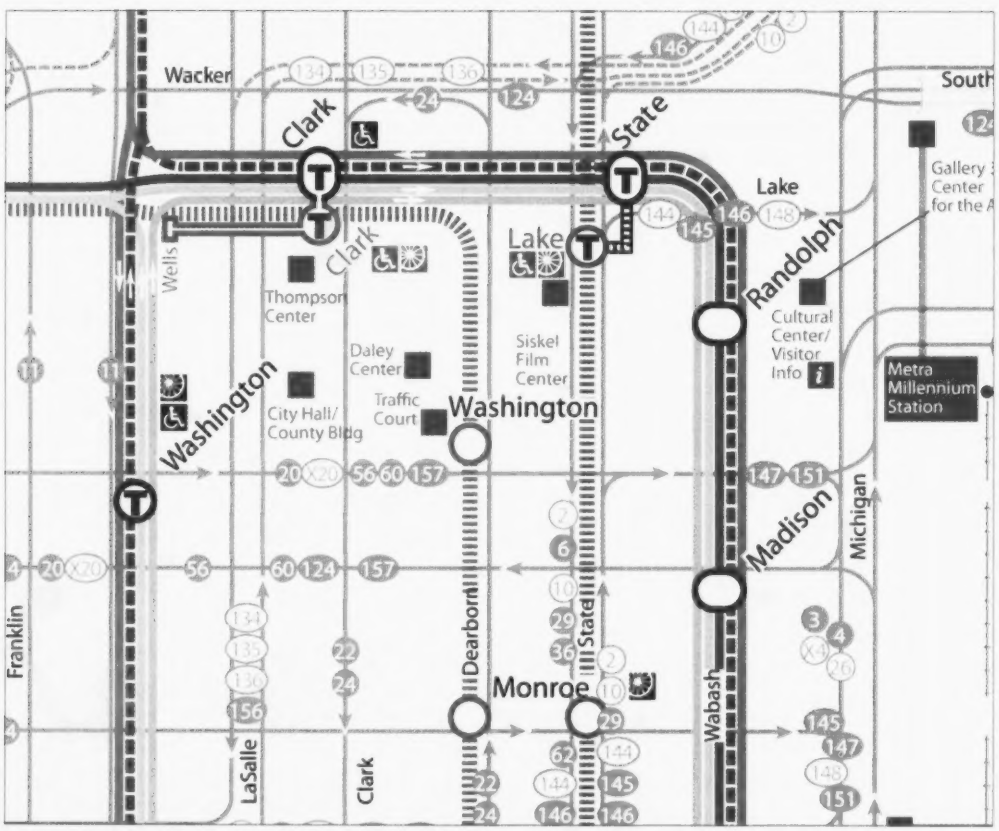
The Canadian Transit Handbook, 3rd ed. – Chapter 4 System Financing (Canadian Urban Transit Association)

International Infrastructure Management Manual (New Zealand Asset Management Support)

Static Trip Planning Information

3.3.1 Provide route, schedule and fare information in a clear and intuitive manner through various easily accessible media.

Clear and reliable printed and electronic trip planning information allows travellers to determine the most convenient and comfortable path to their destination. A lack of trip planning information can make *transit* frustrating, particularly for new or casual users, and may inhibit ridership growth. Making transit service information available to the public in accessible, easy to use formats that comply with the Accessibility for Ontarians with Disabilities Act (Guideline 3.4.1) enables current and new riders to learn about the transit system and understand how to use it. This section focuses on static trip planning information, which reflects planned routes and schedules, but does not give information on next vehicle information or actual arrivals and delays. Trip planning information that is updated in real-time is discussed in the next section.



System maps should show points of interchange, destination points, connections to other transit modes and other amenities such as wheelchair access and bicycle parking.

Strategies:

system maps 1. Provide a system map showing all routes, stations, transfer points and major stops. The routes should be overlaid on a road map with street names and numbers at regular intervals. The font sizes should be reasonably large (not less than 8-point), with different fonts, colours and sizes used to identify different types of information. Different routes should be indicated using contrasting colours, and an enlarged inset should be used if an area with a large number of converging routes is unclear. Where service connects to other transit systems or regional service, indicate connecting routes and transfer points, and provide contact information for connecting systems.

route maps and schedules 2. Provide route maps showing major street names, locations of major bus stops, transfer locations and points of interest. A route schedule should indicate inbound and outbound trips, as well as landmarks to indicate travel direction. Travel direction may also be shown through labelling or separation into different tables. Schedules for different travel days should also be separated into different tables.

3. All printed transportation information (system and route maps, along with route schedules) should be available at terminals, in vehicles, at transit-accessible shopping malls, at municipal buildings, and in electronic format on the transit agency's website.

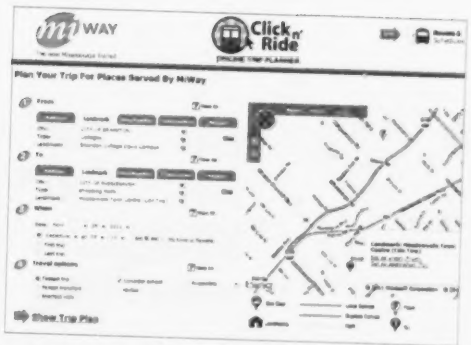
ip planners 4. Develop an interactive, internet-based trip planner to recommend itineraries based on travellers' origins, destinations and departure/arrival times. The trip planner should propose door-to-door itineraries for the requested trip, providing details on time required to walk to and from stops, journey times on transit vehicles, transfer waiting time, arrival and departure platforms at transfer stations, transfer vehicle arrival and departure times, and fare and transfer payment information. The itinerary should provide optional maps of the overall travel path, as well as neighbourhood close-ups. Further, options should be available to email or print the itinerary, and to create an itinerary for the return trip.

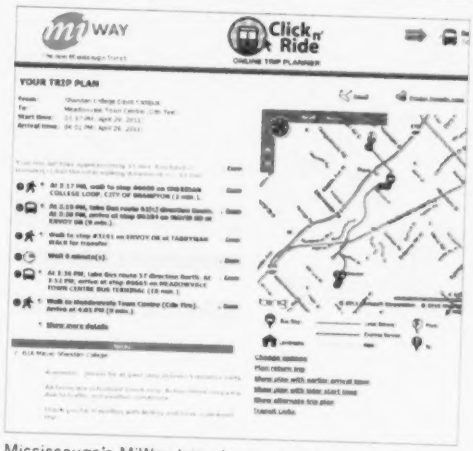
5. Smaller agencies can start with interactive system maps, routes maps and schedules on their websites.

facility mapping 6. Provide maps of stations and major transfer stops showing platform locations, accessibility features (ramps, elevators and escalators etc.), customer service counters, emergency call facilities, bathrooms, station retail services and bicycle parking.

7. Transit system information should include information on multi-modal access, such as connections to other transit systems and other transportation modes such as ferries, airports, bike routes, and pedestrian paths.

legibility 8. Transit information should be made more accessible by providing information in multiple languages, as well as in large print, Braille and audible formats.





Mississauga's MiWay trip planner provides multiple route options, estimated journey times, maps if needed and a range of travel options such as accessible, fewest transfers or shortest walk.

Recommended Resources

Elements Needed to Create High Ridership Transit Systems – Chapter 7 Marketing and Information Initiatives (Transit Cooperative Research Program)

World Wide Web Consortium's Web Content Accessibility Guidelines 2.0 (WCAG)

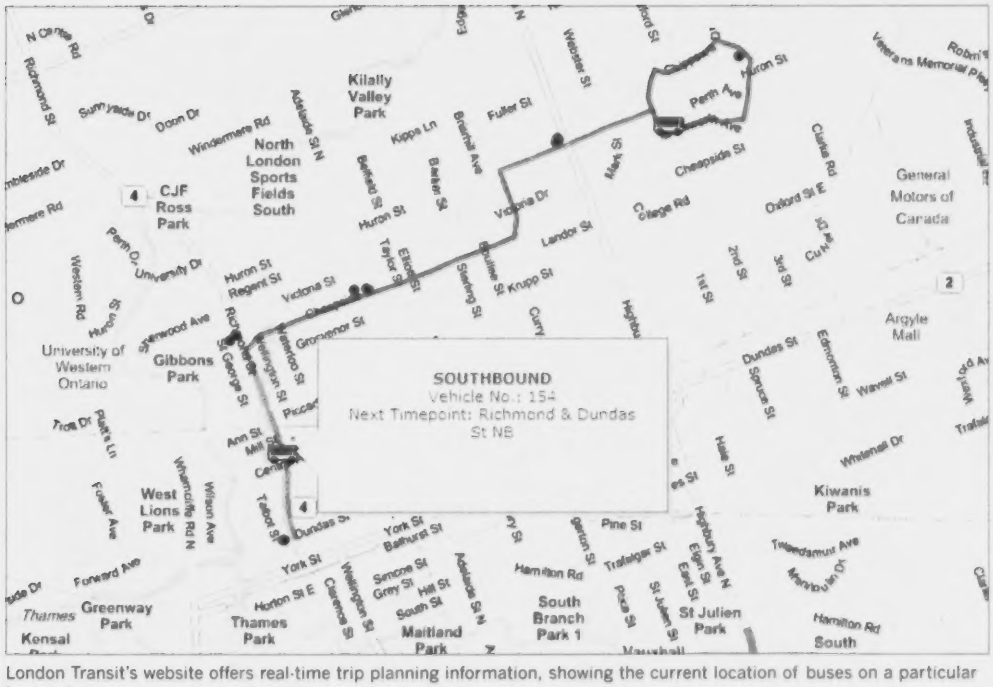
London Transit WebWatch (London, Ontario)

Route Planner (Transport Direct)

Real-time Trip Planning Information

3.3.2 Provide *real-time trip planning information* to inform riders of imminent vehicle arrival times as well as incidents causing delays.

Providing real-time information on individual routes and transit vehicles helps to eliminate some of the uncertainties people have when taking public *transit*. Travellers can feel frustrated when they don't know how long they must wait for the next vehicle or why the bus passed without stopping. This is especially true when vehicle headways are long, and a traveller may be unsure if they have just missed the previous vehicle, and whether the wait for the next one may be long. In such cases, providing real-time trip information gives customers the opportunity to make alternate plans, such as walking, calling home for a ride or taking a taxi. It has also been found that knowing when the next transit vehicle is arriving can make customers feel more secure while waiting at night.



London Transit's website offers real-time trip planning information, showing the current location of buses on a particular bus route.

Strategies:

real-time systems

1. Real-time vehicle tracking requires a variety of elements including:
   - a positioning system, such as GPS or a signpost-based system, with receivers and transmitters on each vehicle;
   - a data processing centre to coordinate receiver and transmitter data collection and dissemination;
   - a communication system consisting of a wide-area wireless network based on radio frequency technology; and
   - a prediction model or algorithm to forecast arrival times based on vehicle location information, vehicle speed, traffic conditions, weather and real-time operating data from several buses on the same route. See Guideline 3.2.3 for information on implementing new technologies.

relaying information

2. To enhance access to information, make real-time arrival times as well as information on delays and alternative routing options available through a variety of media, such as:
   - internet websites;
   - social media tools such as Twitter;
   - telephone;
   - cellular phone text messages;
   - e-mail;
   - interactive kiosks at transit stations;
   - dynamic message signs on rail platforms, and at transit stops and stations;
   - in-vehicle displays; and
   - audio announcements.

3. Make transit information more accessible by providing information in multiple languages, as well as in large print, Braille and audible formats.

system compatibility

4. The real-time information system should be able to communicate with other *intelligent transportation systems (ITS)* hardware and software that the agency may be using for data collection, operations or other purposes. Also ensure that the *automatic vehicle location (AVL)* technology is compatible with other systems, such as the *computer aided dispatch (CAD)* technology.

London, ON Transit WebWatch

The London Transit Commission offers the WebWatch Real-Time Bus Monitor. This allows customers to follow the real-time location of London Transit buses on the Internet using Virtual Earth or Google Map applications. When a route is selected, the map will display all buses on that route at their current location as bus icons that move in real-time. Clicking on or hovering over an individual bus icon or stop will give more detailed information about that item.

WebWatch (London Transit)

Transport For London, UK Delay Notifications

Customers in London, UK that register their prepaid fare cards (Guideline 3.5.1) can receive emails notifying them of delays on the transit system in advance of reaching the stop or station.

Recommended Resources

Case Study: Growing Transit Ridership

Case Study: Targeting Transit Service

World Wide Web Consortium's Web Content Accessibility Guidelines 2.0 (WCAG)

Elements Needed to Create High Ridership Transit Systems – Chapter 7 Marketing and Information Initiatives (Transit Cooperative Research Program)

Wayfinding for Transit Facilities

3.3.3 Establish a consistent and intuitive wayfinding system to assist riders in navigating through transit vehicles and facilities.

Transit systems can be complex and intimidating, so an effective wayfinding system is necessary to make the system more comprehensive, usable and convenient. Not knowing where and how to access transit vehicles, stations and terminals can be a source of confusion and frustration to travellers and a barrier to transit use. Without an intuitive and consistent wayfinding system, including signage, maps and visual and audio cues, travellers may get lost and experience delays and missed connections. These negative experiences can result in reduced rider satisfaction and ridership.

A clear and consistent wayfinding system will save riders time and reduce frustration. This in turn increases the appeal of transit. A comprehensive wayfinding system should be consistently applied to station interiors, station areas, surrounding streets and parking facilities to help orient transit users and direct *pedestrians* toward transit facilities.

Wayfinding systems should be designed for transit users of varying abilities by applying accessible formats to signs and all information displays (Guideline 3.4.1). This will help transit systems to be welcoming to all riders as well as ensuring transit agencies meet the accessibility standards of the Accessibility for Ontarians with Disabilities Act.

The paving and signage at a bus station in Tokyo are used together to direct both seeing and visually impaired passengers between the various parts of the station.

Strategies:

symbols & cues

1. Develop a coordinated system-wide wayfinding plan so that logos, symbols and cues used on vehicles, at stops and in stations are consistent and complementary.

2. Each sign should indicate, at a minimum, the bus route number and name, direction of travel, map and timetable. Additional information can be accommodated by providing telephone numbers and websites where more information can be accessed.

vehicle exteriors

3. The exterior of the transit vehicle should identify the route name, number and the direction of travel. Identifiers should be placed, at minimum, at the boarding point. If a person with a disability, a newcomer or a tourist cannot properly interpret the signage, the operator should be prepared to offer information to passengers upon request.

legibility & accessible formats

4. In transit stations and on vehicles, signs should be designed to be highly legible with accessible displays.
   - Signs should be consistently located, have a glare-free surface and be positioned to avoid shadow areas and glare
   - Use text and graphics together on signs consistently;
   - If signs contain more than one word, use upper and lower case for legibility;
   - Text should be flush to the left and ragged to the right;
   - Reserve red, yellow and green fonts for public safety colours;
   - Maintain consistent font size and use font weight to emphasize importance of information;
   - Signage should be high colour contrast with its background; and
   - Avoid more than five lines in a single directional sign.

building maps & directories

5. For larger transit systems with complex stations, building maps, floor plans and directories should be provided to help orient users to their immediate surroundings. Wayfinding signage should:
   - place site and building plans in the direction corresponding with the setting and the orientation of the user;
   - ensure site and building plans are placed at a height and angle that can be seen by people of all statures and physical abilities;
   - include a "you are here" indicator on site and building plans;
   - display enlarged maps of the area immediately outside of the transit station with the location of the station or terminal indicated so transit users can familiarize themselves with the immediate surroundings and figure out how to get to their final destination;

Wayfinding signage outside a station in Chicago helps to direct transit users to local destinations.

A clock and highly visible directional signage located at a key decision point at this station in Grand Rapids, MI, assists travellers in making quick decisions when travelling through the station.

- display a transit system map which can help users familiarize themselves with the whole transit system;
- include Braille on building plans; and
- display maps and directories that can be replaced to ensure information can be kept up-to-date.

6. Use pedestrian flow modelling to plan retrofits of stations and to improve effectiveness of entrances, exits and connections to the street.

7. Place signs at nodes or decision points (a physical space where two or more paths diverge) in a facility. Use only the information necessary for a user to make a decision. Use maps at key decision points to supplement directional information. At nodes or intersections, place signs such that they may be seen from all directions.

community wayfinding

8. Provide information and maps indicating walking and cycling trails, transit routes and local destinations at transit stops, station areas and key destinations as appropriate.

9. Wayfinding signage should be placed on streets around station areas to assist people travelling to the station. Orient way-finding maps so that the top of the map is in the direction the pedestrian is facing. They should be placed, at a minimum, every other block on all major streets or arterials within a six-block radius from the station. Information should include:

- the transit system logo;
- the direction of the station;
- the transit route name(s) and number(s) and transit station name; and
- the distance to the station.

technology

10. Consider developing smart phone applications, which provide information on the location of transit stations or stops.

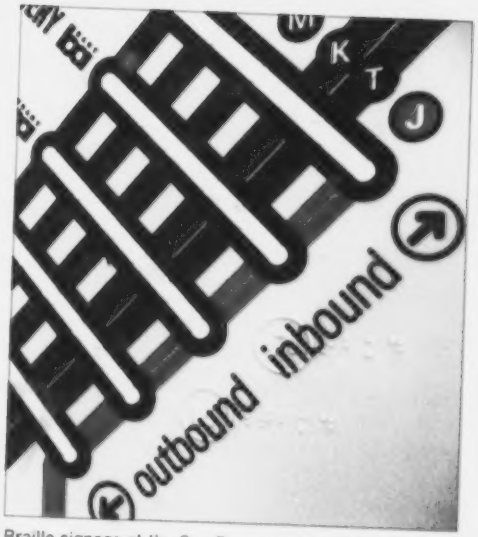
11. Over longer distances, signs should be repeated to reinforce the information.

audio information

12. Visual wayfinding information should be complemented with audio information, and vice versa to assist people with visual and hearing impairments.

customer service attendants

13. Place transit personnel strategically throughout the system to answer questions and provide guidance (e.g. GO Transit's "transit ambassadors").



Braille signage at the San Francisco MUNI station assists people with visual impairments.

Recommended Resources

Code of Practice: Passenger Terminal Accessibility (Canadian Transportation Agency)

Accessible Design for the Built Environment (Canadian Standards Association)

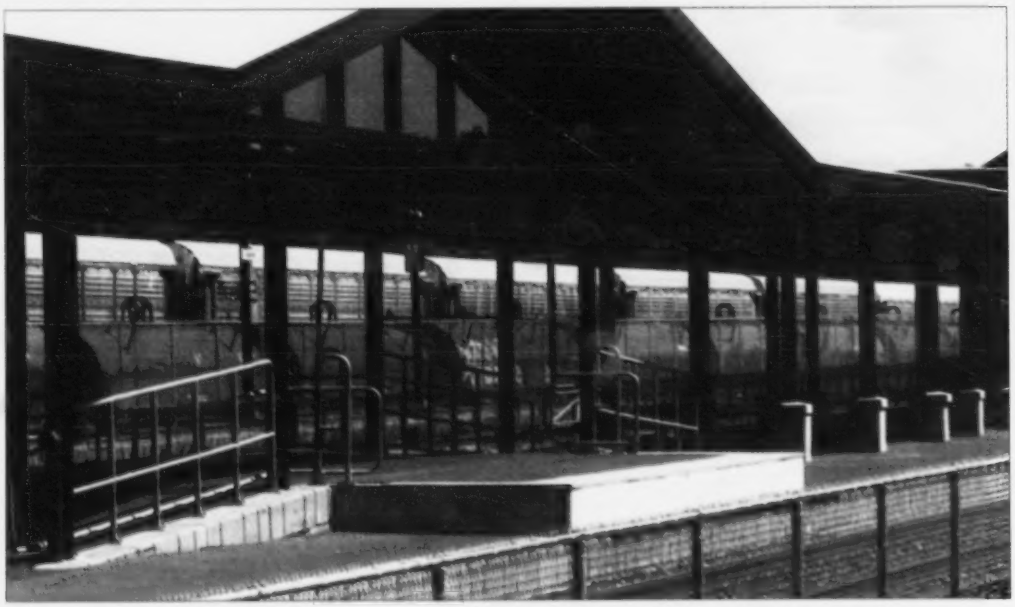
Universal Design New York (Center for Inclusive Design and Environmental Access, School of Architecture and Planning, University at Buffalo, The State University of New York)

Universal Design for Accessibility

3.4.1 Establish policies, practices and procedures for making *transit* accessible to all and capable of accommodating a range of daily transportation needs.

Most transit riders will experience some form of disability during their lives. Inaccessible transit facilities can make using transit difficult or impossible for people with mobility, visual or other disabilities. Designing transit systems for universal access provides people with disabilities more transportation choices and enables them to participate fully in their communities. Universal access can also help other transit users meet their daily needs, for example, shoppers with carts, parents with children in strollers, travellers with luggage, and the elderly. Meeting a greater range of transportation needs helps build transit ridership.

Making conventional transit more accessible requires a set of comprehensive measures that address the entire trip from getting to the transit stop to boarding to reaching the trip destination. Such measures include accessible vehicles, accessible bus shelters, bus stops and stations and transit information that can be understood by people of all abilities, including newcomers. Ontario's Accessibility for Ontarians with Disabilities Act, 2005 (AODA) requires transit agencies to meet accessibility requirements under various standards, including the Accessible Transportation Standard and the World Wide Web Consortium's (W3C) Web Content Accessibility Guidelines (WCAG) 2.0, Level AA. The Transportation Standard will require transit agencies to put in place a comprehensive set of measures, including accessibility plans, specific accessible transit vehicle equipment standards, accessible boarding and deboarding of vehicles, service improvements in specialize services, such as integrating accessible services between communities, hours of service, booking procedures and on-time pickup. Implementing best practices in transit accessibility improves transit service and can help transit agencies prepare for the Standard.



This sheltered, wheelchair-accessible platform at a GO Station is well integrated with the rest of the train platform.

Strategies:

accessibility planning

1. Municipalities should plan accessibility for all aspects of its transit system that will be used by the public. The accessibility plan should develop and document policies and procedures that address the following components of the transit system:
   - accessible buses, streetcars, trains, LRT and other vehicles;
   - accessible routes and transfers between systems (See Guideline 2.3.5);
   - transit facilities, including stops, shelters, stations and platforms;
   - transit information, including emergency procedures; and
   - staff training.
2. Consult organizations for people with disabilities for input into and feedback on accessibility plans.
3. An audit of system accessibility should be carried out by a committee of stakeholders to track progress of the plan, obtain user feedback and comments on additional possible improvements.
4. Establish a continuous monitoring process for recording problems, and receiving and responding to feedback regarding services to persons with disabilities. Define specific actions to respond to different kinds of complaints. Make the information about the feedback process available to the public in an accessible manner.

information

5. All transit information for the public, including static and *real-time trip planning*, should be available in accessible formats (see sidebar right).

fare payment

6. *Smart cards* may be programmed to simplify choices by issuing a preset amount of money; displaying larger characters, colour contrast and reduced glare for people with low vision; and increasing audio output for people with low hearing. Smart card vending machines should have a range of accessibility features, such as lower heights and electronic displays in an accessible format.

transit facilities

7. Station and terminal platforms, passageways and station levels should accommodate and be accessible to persons using assistive devices and support animals.
8. When refurbishing or building new bus shelters, plan for accessibility by ensuring that the floor space can accommodate wheelchairs and scooters turning 180/360 degrees and that walkways have visual cues for people with low vision.

Accessibility for Ontarians with Disabilities Act

Ontario's legislation on accessibility, the Accessibility for Ontarians with Disabilities Act is to include a new standard for Accessible Information and Communications that will apply to transit agencies. To meet the new standard, transit agencies should plan to provide information on their internet website that conforms with the World Wide Web Consortium's (W3C) Web Content Accessibility Guidelines (WCAG) 2.0, Level AA

For information that is not provided on the website, transit agencies should be prepared to provide the information in an accessible format upon request. The suitability of the accessible format should be determined by consultation with the person making the request, and the format should take into account the person's disability.

Peel Region's Transhelp

Peel Region Ontario has established regional *specialized transit* services that are dedicated to people who cannot use conventional transit. Transhelp provides transportation across the region and connects people to three different municipalities. Its website provides detailed information on its services and steps to take to register and book trips. Transhelp is a good example of recognizing and meeting the transportation needs of the disabled *community transit* riders on a regional basis.

Peel Region Transhelp

transit vehicles

9. Provide accessible vehicles for people with mobility issues, support animals and assistive devices. Examples include low-floor and/or kneeling buses, buses with ramps or lifts, and rail vehicles with doors at platform level. Other types of accessibility features include:
   - non-slip floor surfaces;
   - high colour contrast on steps and doorways for greater visibility;
   - padded back and head supports in vehicles;
   - aisle stanchions to prevent wheelchairs from tipping;
   - additional straps for securing wheelchairs (optional use);
   - flip-up seats in the wheelchair location;
   - visual stop display for rear-facing passengers; and
   - separate stop request button and emergency response controls in the wheelchair area, with a light or sound indicator that is different from the general stop request.

boarding and deboarding

10. Boarding and de-boarding assistance should be provided so that the health and safety of the operator and disabled person are not jeopardized, and should occur only if the location is deemed safe for deployment of boarding and deboarding equipment, if these are required. Otherwise, the operator should allow passengers with disabilities to board or de-board at the closest available safe location that is acceptable to both the passenger and the operator.

on-board announcements

11. Complement visual information with audio information. For example, for the visually impaired, pre-boarding destination announcements, on-board stop announcements, talking signs, talking directories, auditory maps, and audible alarms can significantly improve the travelling experience.

low hearing

12. Complement audio information with visual information. For example, LED/LCD technology and computer screens may be used to present information that is announced over the public address system, as well as pre-boarding destination announcements and on-board stop announcements.

13. Provide tactile cues such as tactile maps, Braille signs along pathways, and detectable warnings along platform edges, as well as detection cues for use with canes.

employee training

14. Provide accessibility training to all employees involved in customer service, with refresher courses provided on a regular basis (for example, every five years). This training should address:
   - sensitivity in addressing various disabilities;
   - boarding, seating and de-boarding responsibilities;
   - the safe use of accessibility-related equipment or features, including transportable *mobility aid securement systems*;
   - the function of support persons, service animals, and assistive devices;

- orientation on the safe use of lifts, ramps and other conveyances;
- the safe handling and storage of mobility aids and assistive devices;
- acceptable modifications to procedures in situations where temporary barriers exist or accessibility equipment fails;
- emergency preparedness and response policies and procedures; and
- responsibilities during an emergency, including the provision of emergency information that an individual with a disability can respond to appropriately, detachment of securement systems and assistance to passengers with disabilities when evacuation is required.

15. Staff, volunteers, contractors and anyone who is involved in developing transit policies, practices and procedures should be trained on the agency's accessibility and customer service standards.

16. Travel training can be provided by the transit agency to promote and inform the community on a system's accessibility improvements.

community accessibility

17. Improve community accessibility by:
    - improving accessibility throughout the community's *infrastructure* (e.g. curb cuts, sidewalks, access to bus stop locations);
    - adhering to the Accessibility for Ontarians with Disabilities Act (AODA) requirements;
    - ensuring that adequate designated parking spaces as well as drop-off and pick-up points are free of obstructions, are in close to entrance and exit locations and are fully accessible;
    - providing accessible parking spaces at transit stations and terminals (Guideline 2.5.2)
    - ensuring that all subdivisions are accessible by specialized vehicles;
    - providing traffic light audio alerts near transit points, as well as the wider community; and
    - including persons with disabilities in the review of community, subdivision and site plans.

demand responsive transit

18. Demand-responsive transit services should be provided for those who cannot use conventional transit service. This service should be provided during the same hours and for the same fare as conventional transit. See Guideline 3.1.3 for strategies for improving demand-responsive transit operations.

Accommodating Wheelchairs in Vehicles

Vehicles that accommodate wheelchairs in a rear-facing position have been found to enable persons using mobility aids to position themselves independently within an accessible urban transit bus. With the passenger's back and head near a load-bearing panel, this approach uses the vehicle's mass and operating dynamics to protect passengers who use wheelchairs in cases of severe braking or collisions. It also provides independence to the wheelchair passenger, adapts to most wheelchair and scooter sizes and types, does not generally require the assistance of the operator and requires shorter dwell times.

Recommended Resources

Regulation 629: Vehicles for the Transportation of Physically Disabled Passengers, Highway Traffic Act (Province of Ontario)

TTC Accessibility (Toronto Transit Commission)

GO Transit Accessibility (GO Transit)

Access ON (Ontario Ministry of Community and Social Services)

Communicating with Persons with Disabilities in a Multimodal Transit Environment (Transit Cooperative Research Program)

Bringing Opportunities to Life: Accessible Transit in Canada (Canadian Urban Transit Association)

Urban Braille System (City of Hamilton)

Access for Cyclists

3.4.2 Evaluate existing transit facilities and services to determine the best and most effective approaches for enhancing access to transit for cyclists.

Transit systems often have limited resources to improve facilities and services. Integrating bicycle use with transit service is an effective means of attracting new riders by increasing the catchment areas of stations and stops without expensive investments in route expansion or new routes. However, careful investigation, planning and consultation are still required to determine where resources are best spent and to ensure smooth implementation.

This LRT vehicle in Minneapolis has been designed to accommodate cyclists during all hours of the day.

Strategies:

partnership 1. Develop community support by engaging local bicycle groups, students, public health organizations and environmental groups. Build support by partnering with other community efforts to increase *active transportation* and development of *transportation demand management (TDM)* programs.

planning strategies 2. When planning bicycle services to meet the needs of the community, consider the following factors:

- transit ridership characteristics, including age and demographics of transit riders;
- local topography and land-use patterns around transit stops and station areas and whether or not the land use pattern is supportive of cyclists;
- areas of existing high bicycle use or with future potential (work with local cycling groups to identify these areas);
- the number and extent of existing bike friendly routes leading to and from to transit stops and stations;
- regional and municipal support for cycling initiatives;
- the authority and ability of the transit agency to implement measures, such as designated lanes and paths; and
- the costs of accommodating bicycle services and benefits from decreased parking and congestion.

3. Develop a program to improve bicycle access by considering all stages of the bicycle commute, including routes to and from the stop or station area (Guideline 2.2.4), the design of the station, bike parking and storage (Guideline 2.3.4) as well as the ability to load onto transit vehicles.

4. Consider transit staff training to overcome any initial concerns with bike racks on buses or onboard loading, including:

- instructions on use of bike racks;
- safety and liability issues;
- operation of the bus with loaded bike rack – wider turns, overhang; and
- customer service issues.

5. Ensure bus garages can accommodate extra bus length due to bike racks and plan maintenance of bike racks as part of routine bus maintenance.

promotion 6. Promote and market new services through transit websites, brochures, bicycle events, community outreach and the demonstration of loading racks. Be sure to reach beyond the transit community to the bicycle community.

monitoring 7. Once implemented, monitor usage of bicycle services and modify to meet demand or to promote services in case of low usage.

Providing bike racks on buses such as in this example from Brampton can enable cyclists to travel longer distances and journey from the stop to their destination.

Toronto-Niagara Greenbelt Express (GO Transit)

GO Transit operates a summer weekend train service between Toronto and Niagara Falls with stops en route at Exhibition, Port Credit, Oakville, Burlington and St. Catharines. The Niagara GO Trains have two designated coaches which can carry up to 18 bikes each. In other train coaches, with the exception of the accessibility car, four bikes are permitted.

Toronto-Niagara Greenbelt Express

Recommended Resources

Bicycling and Transit: A Marriage Unrealized (Transportation Research Board)

Ontario Bikeways Planning and Design Guidelines (Ontario Ministry of Transportation)

Portland Bicycle Plan for 2030 (Portland Bureau of Transportation)

Mobility Hub Guidelines (Metrolinx)

Amenities and Services

3.4.3 Provide amenities and services that improve the comfort and convenience of transit travel and enable riders to accomplish personal and business related tasks along their trip.

Travelling by *transit* is often perceived as slower, less convenient and less comfortable than the private automobile. Waiting at stops and transfer stations is often considered an onerous part of a transit trip, especially if travellers have nowhere to sit and no activities to distract them from the wait.

The trip can be made more enjoyable by providing travellers with places to sit and activities to enjoy while waiting for transit, or services that allow busy commuters to accomplish personal and/or business-related tasks. Such comfort and convenience can make riding transit more attractive than sitting in traffic in a personal vehicle.

North Killingsworth LRT station in Portland, OR, provides a variety of seating and standing options with incorporated public art for passenger enjoyment.

Strategies:

passenger comfort

1. Passenger comfort can be improved by a range of amenities including:
   - benches near bus stops, in stations and on platforms;
   - weather protection;
   - waste and recycling receptacles, so that station and stop areas are more likely to stay free of litter; and
   - public restrooms (paid or unpaid) at *major transit stations*, with an emergency call button. Also, if possible, locate the rest room near a service counter or kiosk to improve security.

passenger enjoyment

2. Provide enjoyable activities and public art to contribute to a positive experience for riders. Examples include:
   - showcasing local art in and around stations and stops;
   - providing information on the neighbourhood, including history, station design and special aspects of the community; and
   - locating stops near lively retail areas, and/or incorporating retail space into station areas to allow passengers to purchase food and reading material or to run errands while waiting for transit.

3. Landscaping can contribute to user experience by helping to mitigate the impacts of strong sun or wind and providing an enjoyable backdrop to transit facilities or along transit *corridors*.

passenger convenience

4. Where feasible, explore opportunities for partnerships with the private sector to deliver services that can add to the convenience of commuting by transit. For example:
   - at high-volume transit stations, assess the station for retail opportunities and convenient services;
   - make wireless internet available at stations and on vehicles;
   - incorporate space for day care at transit *nodes*, so that parents may conveniently pick up their children on the way home; and
   - consider partnerships with private service providers to offer a one-stop "errand" services at transit stations enabling passengers to request a variety of errands to be performed during the day while they are at work.

Performers in stations enhance the commuter experience.

Convenience retail at stations can enable commuters to make quick purchases before and after their journey.

Portland Glass Panel Repair

In Portland, the transit authority sandblasts glass panels at its bus stops to curb vandalism. Vandalized panels are removed and sandblast with motifs designed by artists and reinstalled. The reuse of vandalized glass is expected to save up to $100,000 in replacement costs annually while providing a forum for artists.

Recommended Resources

Art in Transit (Public Art Online)

Mobility Hub Guidelines (Metrolinx)

Child Care and Transit, Making the Link in California (Caltrans and Metropolitan Transportation Commission)

Safety and Security

3.4.4 Implement design elements, patrol programs and technologies to enhance safety and the sense of safety in the *transit* system.

Actual and perceived lack of safety at transit stops, stations and platforms can result in lost ridership, stigmatization and lower revenue. Vandalism and crime also cause damaged equipment, lost workdays, and compensation payments, and affect employee health and morale. Transit agencies are responsible for minimizing the risk of crime to ensure that operators and travellers feel secure in transit vehicles, at stops and in stations.

Much of the risk and fear associated with crime can be reduced through changes to the design of vehicles and facilities to improve sightlines and visibility. Further security can be gained through technologies that enhance visibility, surveillance and response measures. Patrol and educational programs can also mitigate the impacts of crime and traveller fears. Implementation of these measures can deter criminals and reduce the financial and operational costs of crime, increasing the sense of security for travellers, and preventing loss of ridership. Higher levels of system usage at all times of the day can provide *natural surveillance* and increase the sense of safety.

Designated waiting areas provide well lit locations supported by emergency phone or intercom systems and video surveillance for people to wait during quieter hours of operation. This can contribute to increased passenger safety.

Strategies:

planning strategies

1. Conduct a review of security in the transit system to determine where system practices, policies and physical features could be modified to improve safety. As part of this effort, an inventory of potential hiding areas should be conducted, and strategies should be developed to correct them where possible. Evaluate the expected benefit and cost of each potential security improvement and develop a prioritized plan.

2. Develop a process for continuously monitoring and recording problems, and receiving and responding to feedback regarding security concerns. Specific actions should be defined to respond to different kinds of complaints. The information about the feedback process should be available to the public.

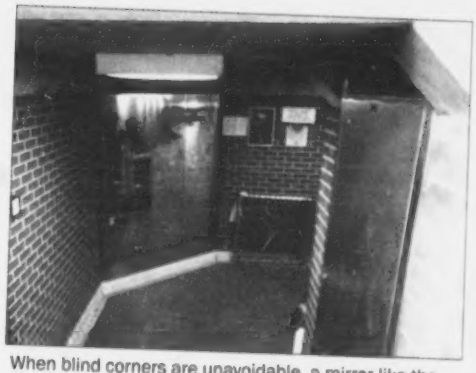
improving sightlines

3. Sight lines and visibility should be made clear by, for example:
   - extensive use of glass in shelters to enhance natural surveillance and lighting;
   - incorporating glazing of exterior walls, stairways and elevators to permit natural surveillance;
   - designing landscaping so that it does not block views or lighting; and
   - using mirrors to enable people to view around corners where blind corners are unavoidable.

enhancing safety

4. Station and terminal designated waiting areas (DWA) with higher levels of lighting and emergency phone or intercom systems can help to enhance user safety during quieter hours or evening service.

5. There are a range of security-related policies and programs that transit agencies could consider to enhance user safety or perceived safety. These include:
   - allowing passengers to get off the bus between stops at night time. The driver must be able to stop safely to accommodate the request. The passenger must leave the bus by the front doors, and the rear doors remain closed so that no one can follow the passenger from the bus;
   - deploying transit security officers in and around stations, on trains and buses, and at bus stops at times and locations where security problems are common or expected;
   - training transit employees, such as vehicle operators, in conflict resolution, robbery / assault prevention, gang awareness, customer service and self-defence;



When blind corners are unavoidable, a mirror like the one used at this GO Station allows visibility around corners.

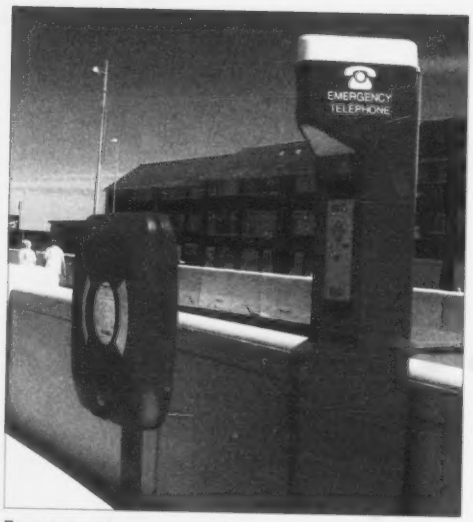
The use of glass in this shelter in Calgary, Alberta enhances natural surveillance and lighting.

- providing public education and information in the form of pamphlets, posters, wall cards, stickers, magnets and films to publicize crime prevention initiatives and safety tips;
- setting up crime prevention booths at events and exhibitions to address public crime and safety issues with citizens and employees;
- establishing reward programs to solicit information from employees and the public to identify criminal offenders; and
- establishing an Adopt-a-Shelter program to link citizens and police to deter vandalism and criminal activity at bus shelters. Citizens are encouraged to commit to bus shelter "ownership", resulting in immediate reporting of criminal activity to police.

technology 6. Where physical sightlines may be difficult to achieve, technology may be used to enhance visibility and enable communication between passengers and staff. Examples include:

- deploying closed-circuit television (CCTV) camera surveillance systems in and around transit stations, stops, vehicles and depots. They may be mounted, for example, at restroom entrances, fare collection areas, and elevator/escalators. Cameras may be fixed or remotely controlled to allow for panning, tilting and zooming. Real-time monitoring can be labour-intensive; however, pairing CCTV with motion-detection systems can provide event-triggered surveillance;
- implementing telephone and radio communication devices in stations, at stops and on vehicles to allow passengers to seek assistance from transit personnel or local police;
- implementing *automatic vehicle locator (AVL)* and *geographic information system (GIS)* to facilitate vehicle tracking in case of incidents;
- providing incident management information and directions to passengers on dynamic message systems which might typically be used to show vehicle arrival times;
- improving lighting on platforms and at bus turnarounds, stations, *park-and-ride* lots, transit centers, bus stops and restrooms to improve visibility and deter crime; and
- using alarms to deter criminal activity and summon police and security assistance.

7. The use of automated ticketing machines and *electronic fare payment (EFP)* can help to make cash handling more secure and reduce exposure of transit employees to crime and threats.



Emergency phones should be easy to locate and brightly coloured.

Recommended Resources

Transit Security Design Considerations (US Federal Transit Administration)

Improving Transit Security (Transit Cooperative Research Program)

Issue Paper 23: Transit Safety and Security (Canadian Urban Transit Association)

Crime Prevention Through Environmental Design

Fare Strategies

3.5.1 Provide fare incentives, simplified fare structures and more convenient payment options to make transit more affordable and easier to use.

Traditionally, the most common objective of transit pricing has been to increase revenues in response to actual or forecast increases in operating costs while minimizing the loss of transit ridership. However, as sustainable transportation becomes a more pressing issue, increasing transit ridership and mode share are becoming primary objectives of their own.

To attract and retain transit riders, the cost and convenience of *transit* use must be competitive with the costs of using an automobile. Adjustments to fare levels, fare structures and fare collection methods can make transit less expensive and more convenient for riders. For example, simplified fare structures, such as flat fares with no differentiation by distance, time or service type, are easier for riders to understand and tend to boost ridership, depending on the price level.

Fare collection cards, partnerships and online payment options can also be incorporated into a broader marketing and promotion strategy (Guideline 3.5.5) and data from these can be used in planning transit services (Guideline 3.2.2).

The use of smart cards programmed to charge the lowest applicable daily fare can ease decision making and promote greater ridership.

Strategies:

affordability

1. Make fares more affordable by providing reduced base fares, free transfers, free fare zones or discounts for multi-ride tickets and passes.
2. Transfers can be simplified by offering short-term (e.g. 90-minute) unlimited, not directionally restricted, ride passes to encourage transit use for quick errands. A day pass that is priced at the equivalent of two or three linked trips can also help to improve rider convenience, minimize fare administration and minimize rider-operator arguments regarding transfer validity.

convenience

3. Implement automatic fare collection systems (magnetic cards or *smart cards*) to improve fare payment convenience and efficiency.
4. Expand fare card distribution and reloading options. This can be achieved by selling fare media at more retail locations or transit stops, and implementing reloading by cell phone or Internet.
5. The use of pre-paid fare cards can reduce boarding times, thereby improving transit speed and reliability while providing transit agencies with the benefits of improved revenue control and the financial advantage of receiving payment before the cost of providing service is incurred.
6. To encourage the use of pre-paid fare cards, offer discounts relative to cash or tickets.
7. Program smart cards so that they automatically charge the lowest applicable fare. This can help to ease decision making and increase passenger desire to ride.
8. Account-based automatic recharging of smart cards can provide additional convenience for busy commuters.
9. Establish a regional integrated fare policy and collection system to allow riders to travel seamlessly on different transit systems across a single *region*. Integrated fare strategies include: free transfers between systems, discounted fares between systems or use of a common fare card to increase the convenience and affordability of public transit.

programs and incentives

10. Partner with employers, universities, retail stores and events organizations to offer fare incentives or integrated fare payment options and programs. (Guideline 3.5.3)
11. Offer loyalty points or partner with a loyalty program, such as a reward miles program so that riders are rewarded for each transit trip they take or given an incentive for accessing certain services (Guideline 3.5.3).

Transit Loyalty Programs

Edmonton Transit Systems established a transit loyalty program offering recognized air travel points to customers who purchased their monthly passes online. Following introduction of the program, there was a 21% jump in sales of adult monthly passes.

In a variation to the program, Edmonton Transit, along with the TTC, OC Transpo and STM, allow people who collect air travel points to redeem their points by purchasing monthly transit passes.

Partnership with Loyalty Program
(City of Edmonton)

Recommended Resources

Case Study: Promoting a Change in Travel Behaviour

Elements Needed to Create High Ridership Transit Systems – Chapter 8 Fare Collection/Structure Initiatives (Transit Cooperative Research Program)

Traveler Response to System Changes – Chapter 11 Traveler Response to Changes in Fares (Transit Cooperative Research Program)

A Guide to Preparing a Ridership Growth Strategy (Ontario Ministry of Transportation)

Changing Demographics

3.5.2 Recognize demographic trends and plan to adapt *transit* services to meet the lifestyle and travel needs of a changing population.

Most Ontario communities undergo continuous demographic change, including some changes that are becoming long-term trends. Many communities will see an aging population, as well as a higher proportion of seniors in the population. Some communities will experience increases in overall population from the settlement of immigrants, while others will see their population stabilize, or even decline.

Communities may see shifts in local settlement patterns, for example, an increase in families living downtown or a shift of new immigrant populations moving away from urban centres to suburban or *acreage style developments*. These demographic changes will affect travel patterns and demand. By recognizing and accommodating these changes, transit agencies can capture or maintain ridership, while continuing to provide valuable transportation service to the community.

Demographic Variables	**Impact on Travel Behaviour**
• Population (numbers of people, population growth rate) • Geographic distributions/concentrations	Influence on demand for transit and other forms of mobility
• Gender characteristics (male, female)	Different travel needs and patterns

Age and related characteristics; e.g.
• Cohorts such as the 0-15, 16-64 and various 64-plus groups
• Trends for other groups (e.g., "Baby Boomers"; elderly seniors (80+); etc.)
	• Different travel needs and patterns
	  • e.g., Children and youth aged 0-15 and seniors who do not or cannot drive may need to rely on transit to a greater degree than others
	  • e.g., "Baby Boomer seniors may have different travel expectations than previous senior groups
	• Age characteristics may be a factor in marketing or influencing transit uptake

• Immigration (including migration from within Canada) • Ethnicity	• Influence on propensity to take transit • Cultural and other expectations for transit use and mobility
Household characteristics (e.g., family size and composition; income)	Influence on car ownership, ability and need to use transit for mobility
Work and workplace characteristics (e.g., who is working; trip to work)	Influence on commuting and other work-related travel

Consider the demographic characteristics of a community and its people in terms of their influence or impact on transit and transportation demand. This can help to anticipate changing cultural and community expectations, and enable transit agencies to target prospective transit users for marketing or education purposes.

Strategies:

assessing trends

1. The demographic trends in the transit agency's *region* should be examined, and the cultural, residential, employment and activity patterns of changing segments of the population should be investigated to develop plans on better serving their travel needs. Developing programs and services to meet transit needs of changing population trends requires anticipating future needs correctly, and the long-range planning and assessment of transit assets and resources to meet those needs.

aging population

2. Due to reduced physical capabilities, many older people find using public transit difficult. To meet the needs of the growing number of elderly, consider the following:

   - planning system-wide accessibility improvements, as mandated by the Accessibility for Ontarians with Disabilities Act;
   - planning for greater demand on *specialized transit* services;
   - assessing whether transit facilities and amenities are comfortable and safe for seniors;
   - assessing the combination of demand-responsive services with conventional routes;
   - assessing whether transit routes and stops are serving destinations frequented by seniors, and whether schedules are meeting their demand;
   - providing targeted services, such as shuttles from seniors housing to shopping and medical centres;
   - working with social agencies and health networks to determine transportation needs of their clients and investigating opportunities for *community transportation*;
   - providing lower off-peak fares for seniors;
   - providing travel training to familiarize seniors with transit service;
   - designing transit system information to be legible by seniors; and
   - continuous monitoring of demographic changes through study of travel surveys such as Transportation Tomorrow Survey and the Canada Census

newcomers

3. Given the greater propensity of new immigrants to use transit and the fact that immigration is a major source of population growth in large centres, immigrants represent an important market for transit agencies. To capture ridership from new immigrants, consider the following:

   - providing transit information on web sites and in print in the languages of local new immigrant communities;

The proportion of seniors (age 65+) is continuously increasing compared with other age groups. Seniors are showing a tendency to stay longer in their houses, downsizing to smaller households as they get older.

As seniors age and give up driving they become more reliant on transit. The discretionary nature of senior trips, however, means that many of their trips are made during off-peak hours when transit service is lower.

OC Transpo – Seniors Ride Free on Wednesdays

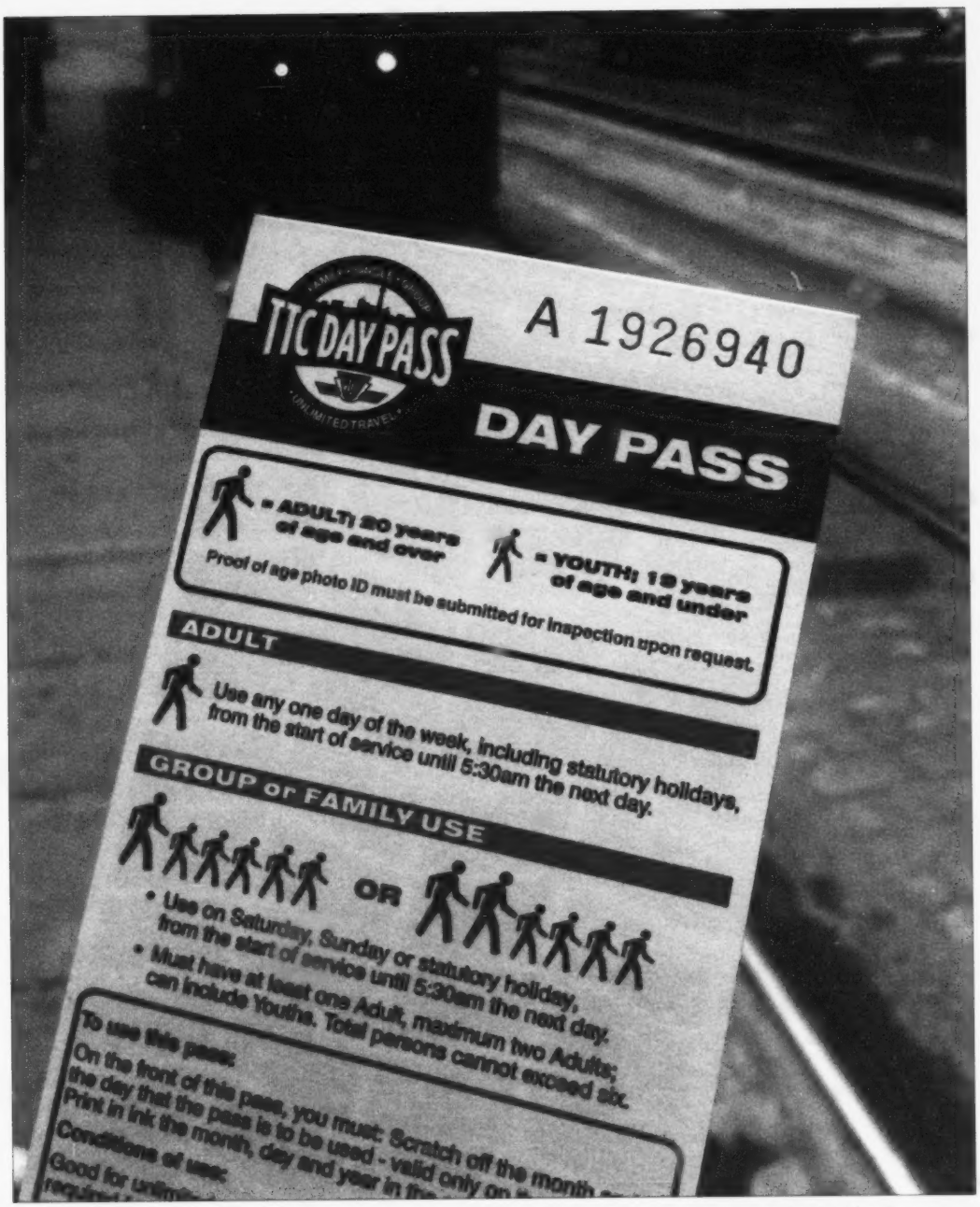
Riders age 65 or older do not pay a fare on Wednesdays when proof of age is shown to the operator. Seniors' clubs in Ottawa are also using this free transit opportunity to plan activities on Wednesdays and offer additional programs for seniors, as they are able to take advantage of free transit.

Seniors Ride Free on Wednesdays (OC Transpo)

Burlington Transit Youth Ambassadors

Burlington Transit, in association with Burlington Green, is developing the Burlington Transit Youth Ambassadors program in local high schools. Ambassadors coordinate and host a series of information sessions throughout the year and answer questions about Burlington Transit.

Burlington Transit Youth Ambassador Program (Burlington Transit)



Family passes such as those provided by the Toronto Transit Commission are a great way of attracting family riders to use transit on weekends and holidays.

- making transit information available to immigrant communities at their workplaces, community venues and shopping areas;
- providing transit training to inform new users about transit options, fares and system use, with content tailored to immigrant populations; and
- assessing whether transit routes, service frequency and service hours are meeting needs of neighbourhoods or places of employment with a high number of immigrants.

families & youth

4. There is growing trend towards more children and youth travelling by automobile than in previous decades which is contributing to lower activity levels within that age group. Car travel has replaced children and youth walking, cycling and riding transit. Transit can be made better for traveling with children and more attractive to youth by:

- providing family passes that enable a family to travel for the cost of a single pass during evenings or weekends;
- offering discounted fares or free transit for younger age groups;
- offering timed transfers to enable multiple stops on one fare;
- developing programs that welcome children and youth onto transit, such as providing transit information to schools;
- providing information on school-specific transit routes and schedules;
- locating convenient services at transit stations;
- assessing the transit system from perspective of a parent with a stroller; and
- providing transit services to family attractions.

declining population

5. Population growth in Ontario will not be distributed evenly to all regions in coming years and some communities will experience no population growth or declines in population, which will reduce overall transportation demand and may result in drops in ridership and lower fare revenues. Transit providers can prepare for these changes by:

- evaluating service for long-term efficiency and effectiveness;
- developing plans to shift modal share to transit;
- assessing partnerships with neighbouring communities to share or contract transit operations and vehicles;
- investigating opportunities to coordinate community transportation assets such as services offered by hospitals, social agencies and volunteer organizations to provide more integrated and cost-efficient services to a community; and
- assessing ways to maintain transit services to community members who do not have access to other means of transportation.

A 2004 Statistics Canada study has shown that persons who had immigrated within the previous 10 years were about twice as likely to commute by transit than Canadian born residents in the same communities. This greater tendency to take transit continued even after the first 10 years of settlement and after taking income differences into consideration. Recent immigrants in large urban centres are tending to settle away from the core.

Public Transit Use Among Immigrants, May 2004 (Statistics Canada)

Recommended Resources

Case Study: Small to Mid-Sized Community Transit

A Profile of Canadian Ridership (Canadian Urban Transit Association)

2006 Community Profiles (Statistics Canada)

Census Trends, 2006 Census (Statistics Canada)

Ontario Demographics (Ontario Ministry of Finance)

Your Community in Profile (Ontario Trillium Foundation)

Age-Friendly Rural and Remote Communities: A Guide (Public Health Agency of Canada)

Child and Youth Friendly Land-use and Transport Planning Guidelines for Ontario, Version 2 (Centre for Sustainable Transportation)

Checklist of Essential Features of Age-Friendly Cities (World Health Organization)

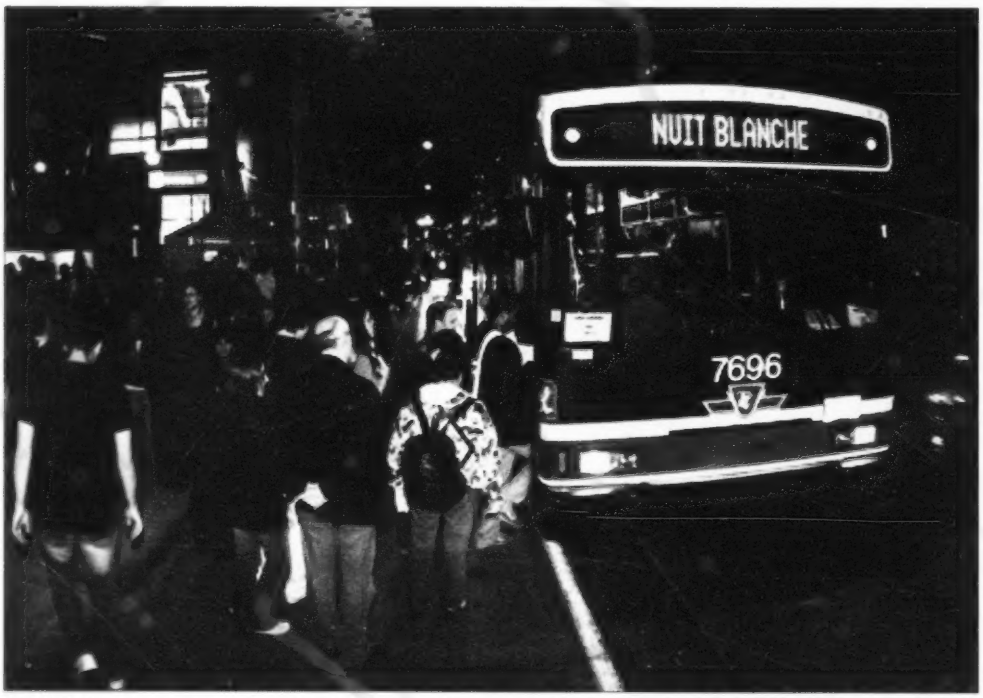
Global Age-Friendly Cities: A Guide (World Health Organization)

Targeting Ridership through Partnerships

3.5.3 Establish partnerships with different organizations to provide and promote *transit* use among their members, including employees, students or patrons.

Activities and destinations that attract waves of people at the same time, or with similar schedules can result in traffic congestion and the need for large parking lots to accommodate patrons who generally arrive by automobile. By providing convenient transit service to destinations and events, traffic congestion and the need for large parking lots can be reduced.

A mutually beneficial partnership can be established with organizations. Such partnerships help to target specific groups that have high rates of transit use or help to tap into a market with good ridership potential. For example, youth and young adults in the age 15 to 24 age group account for a disproportionate share of total transit ridership – representing 31% of transit riders while making up only 13% of the share of total population.



The Nuit Blanche art event in Toronto established a partnership with the TTC to offer a discounted price for unlimited travel on all regular TTC services as well as extended hours of operation for the subway.

Strategies:

employer partnerships

1. Transit agencies and *regional*/municipal governments can establish discounted employee transit passes that may be conveniently paid through a payroll deduction. A partnership program with local businesses may include:
   - the provision of transit routes and schedules tailored to meet the needs of employees;
   - the implementation of workplace *transportation demand management (TDM)* strategies in exchange for reduced employee fares; and
   - the acceptance of employee cards in exchange of typical transit passes.

educational partnerships

2. Establish partnerships with schools, colleges and universities to provide free or discounted student transit passes that may be conveniently paid through student fees. Student identification cards may then be used as transit passes, and routes may run on campus. Work with universities/colleges and schools to provide convenient schedules, stop locations and hours of service for students and employees (Guideline 2.6.5).

retail partnerships

3. Establish partnerships with retail stores or shopping centres to provide free or reduced fares to or from their services, or store discounts upon presentation of a transit ticket or pass. This alleviates the need for additional parking, provides riders a means of avoiding parking and congestion, and serves as a promotional tool for transit.

other partnerships

4. Work with local services such as child care and medical care providers at and around transit hubs to increase cross marketing of respective services, for example, providing transit information, promoting family transit passes, indicating services on transit maps.

large events

5. Consider partnerships with special events and tourist destinations to provide free or reduced fares. This alleviates the parking and congestion concerns, provides convenience to tourists and event-goers, and serves as a promotional tool for transit. Transit agencies should adjust schedules and boost service to meet increased demand at the opening and closing of special events, and provide local transit connections to regional service during tourism and festival seasons.

building loyalty

6. Establish partnerships with popular loyalty programs to award points for each transit ride or each dollar spent on transit.

7. Establish partnerships with developers to provide welcome kits to new residents, including information on transit service and passes for free rides. Transit service should be established as early as possible in new developments, before new residents develop automobile-based commuting habits.

Tops Free Ride Home Program

The Greater Cleveland Regional Transit Authority (RTA), and Tops Markets are working in partnership to provide free public transportation to customers that have spent a minimum of $15 at Tops Markets. Participants request a "Tops Circulator Pass" at checkout and if the minimum has been spent, the participant can use the loyalty card to get a bus voucher for the trip home.

Neighborhood Eco (NECO) Pass

Boulder, Colorado offers a reduced cost bus pass program for neighbourhoods that is available for all local bus services. The annual cost for this pass is $75 to $170 per household. There is a 50% subsidy available for first-time NECO Pass neighbourhoods and an ongoing subsidy of 25% to 30% for returning neighbourhoods.

Case Studies

Case Study: Small to Mid-Sized Community Transit

Tops Free Ride Home, Cleveland (Transit Cooperative Research Program)

Chicago Metra Ravinia Service (Ravinia)

Partnership with Loyalty Program (City of Edmonton)

Recommended Resources

Marketing Transit in Canada: Meeting the Ridership Challenge (Canadian Urban Transit Association)

Elements Needed to Create High Ridership Transit Systems - Chapter 6 (Transit Cooperative Research Program)

Promotion and Education

3.5.4 Develop promotions and education campaigns that engage current and potential transit riders, and are based on input and suggestions from the public, stakeholders and transit employees.

Many travellers are entrenched in long-standing automobile-based commuting and travel habits, and may be unaware of the availability and convenience of *transit* services in their area. Promotion and education strategies can be used to encourage transit use by informing existing and potential riders about the availability and benefits of using transit, special incentives being offered to try transit and service schedule changes.

Promotion and education can attract and retain riders by improving public awareness and perception of transit. Effective marketing begins with an understanding of clients' needs and interests, and requires a variety of outreach methods aimed at reaching a broad base of existing and potential customers.

Promoting the benefits of transit services such as this example from Thunder Bay can help to publicize new service improvements or technology enhancements while raising awareness amongst key target user groups and other road users.

Strategies:

gathering information

1. Transit agencies should continually collect and analyze information on public opinion and travel behaviour to understand local travel needs and develop promotional strategies to effectively engage the public. Possible strategies include:

   - involving the public in transit planning through community advisory groups, public hearings, open committee meetings, public information sessions and workshops to obtain input regarding service options and other transit initiatives;
   - conducting surveys (telephone, internet) and focus groups to identify needs, suggest opportunities and measure success;
   - use input from environmental groups, cycling community, seniors, people with disabilities, diverse populations to develop the survey, in order to gather a wide-range opinion;
   - collecting complaints, enquiries and suggestions from the public as input and feedback;
   - identifying concerns regarding transit initiatives early in the decision-making process (both individual concerns and concerns of environmental, political, business and other groups);
   - encouraging transit staff to provide suggestions for service improvement; and
   - using market research tools, such as interviews, surveys, travel diaries and trend assessment to better understand customer needs, preferences and concerns.

increasing awareness

2. Develop promotional programs to increase awareness of transit services, for example:

   - develop special promotions, such as Transit Week, theme days, information sessions, community discussions, raffles, fare-free days and other activities to raise transit awareness;
   - develop marketing campaigns to reach new residents, such as transit welcome packets with system information and coupons for free rides provided to new residents through direct mail, developers or apartment leasing offices;
   - develop marketing campaigns, including social marketing strategies, to reach high school, college and university students, such as welcome packets for incoming students and advertisements in the school newspaper, popular student websites, and social media;
   - develop individualized marketing that informs individuals and households of their alternative transportation options for the trips that they typically make;

"Society in Motion" - Société de transport de Montréal

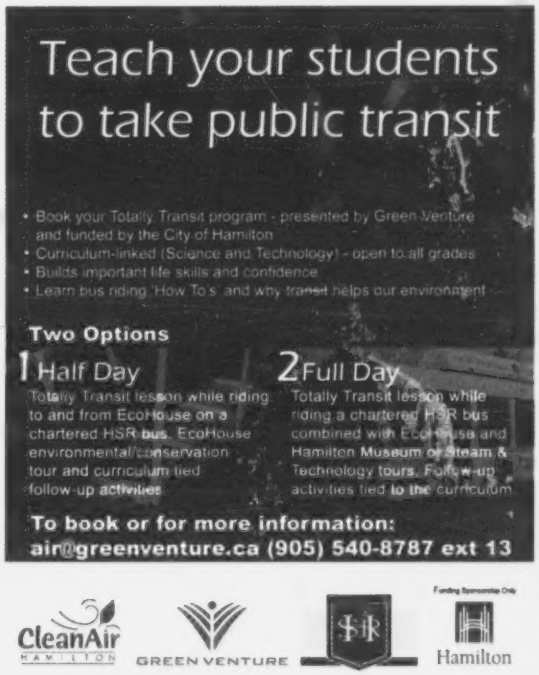
When the Montreal transit system (Société de transport de Montréal) wanted to re-brand itself it didn't want to be known as just another transit system. Its campaign sought to build an emotional connection with consumers by speaking to concerns surrounding mobility, the environment and sustainable city development.

A new website enables riders to express their opinions about new projects underway and act as a forum for the Société de transport de Montréal to publicize new programs aimed at enhancing service and the environmental friendliness of the system.

Society in Motion (Société de transport de Montréal)

Clean Air Commute Campaign

Clean Air Commute is a week-long campaign sponsored by Pollution Probe that challenges companies, organizations and governments to compete with another by collecting points for employees who commute in smog-reducing transportation modes. Participating companies promote telecommuting, commuting by transit, walking, cycling, and carpooling through posters, events, prizes and other incentives. An estimate of the amount of pollution saved from entering the environment through employee participation is calculated at the end of the event. In 2009, an estimated 314 tonnes of pollution was prevented in the Greater Toronto Area.



Grand River Transit has developed a curriculum on transportation alternatives for Grade 3 students to inform students of the impacts of transportation on the environment and familiarize them with using the transit service. Totally Transit Program is a hands-on transit education program that teaches Hamilton's elementary school students how to use transit and make the connections between transportation choices, the environment and human health.

- develop promotions and services for tourists, and advertise at local shops, hotels and tourist attractions;
- use education/marketing campaigns targeting children and youth through schools and organizations to help younger generations gain experience in using transit and to build future ridership;
- use social network methods such as Twitter and/or Facebook that target the core values of specific user groups such as a concern for the environment;
- develop a community based marketing campaign to identify barriers to individuals using transit and provide solutions to overcoming those barriers; and
- include carbon footprint calculators on transit agency web sites to raise awareness of sustainable transportation and transit's contribution to lowering greenhouse gas emissions.

community outreach

3. Consider programs to engage the public in transit issues and increase the profile of transit in the public view, for example:
   - develop branding to increase transit profile, either in general or for certain routes or services;
   - engage the public in the design of the logo or slogan; and
   - provide travel training tailored to demographic groups (older adults, people with disabilities, students, newcomers) to increase awareness of transit services and availability of accessible conventional transit and increase ridership.

media relations

4. The transit agency should have a designated staff member in charge of media relations to deliver a consistent, coordinated message. That person should develop advertising campaigns to reach a large audience of potential riders. Examples of marketing strategies include:
   - advertising events and services through press releases newsletters, brochures, direct mail, web and email;
   - contacting media outlets to propose story ideas and provide information and updates;
   - building relationships with key community figures and the media in support of transit;
   - advertising economic and environmental benefits and features, such as avoiding high fuel prices, reducing air quality impacts and the use of clean fuel vehicles; and
   - partnering with special events to trade advertising space. For example, the transit agency may advertise on event tickets and brochures, and in exchange, the special event may advertise on transit vehicles. The partnership may be expanded to include discounted transit service to and from the event.

Free Transit on Smog Days

In 2001, Windsor City Council approved the concept of offering free transit service on smog days. The City provided $30,000 to cover Transit Windsor's operating costs on free transit days, an amount that was matched by Environment Canada. This funding enabled four free transit days in July 2003.

Transit Windsor observed significant ridership increases of up to 50% on free transit days, and received positive public feedback and media coverage.

Ride to Read

In July 2010, eight local libraries in Durham Region partnered with Durham Region Transit to allow children from kindergarten to Grade 8 who have library cards to ride public transit for free in Durham region. Free bus rides take them to libraries across the region in the summer as part of summer reading program.

Recommended Resources

Case Study: Promoting a Change in Travel Behaviour

Issue Paper 14: Marketing Transit in Canada - Meeting the Ridership Challenge (Canadian Urban Transit Association)

Elements Needed to Create High Ridership Transit Systems – Chapter 7 Marketing and Information Initiatives (Transit Cooperative Research Program)

Traveler Response to System Changes – Chapter 12 Transit Information and Promotion (Transit Cooperative Research Program)

A Guide to Preparing a Ridership Growth Strategy (Ontario Ministry of Transportation)

TDM Toolkit (Fraser Basin Council)

TDM Encyclopedia (The Victoria Transport Policy Institute)

Travelsmart Vancouver (Translink)

Transportation Demand Management (TDM)

3.5.5 *Transportation demand management* (TDM) policies can encourage the use of *transit*, along with other travel alternatives. Implement TDM policies that promote and facilitate the use of transit modes and share the responsibility of encouraging transit use with employers, developers and other organizations.

TDM strategies manage the demand for transportation *infrastructure* and services by affecting people's choice of location, timing, means of reaching an activity and even whether to make a trip or not. These policies aim to reduce travel, distribute trips more evenly, and shift trips from private automobile to transit or other more active modes of transportation. Promoting the use of transit as an alternative to driving is one aspect of TDM.

Policies that increase the convenience and affordability of transit relative to the private automobile will make transit more attractive. *Regions* and municipalities can implement some of those policies, but encouraging actions by, and providing incentives for, employers, developers, schools and other organizations can often have a more direct impact on people's travel choices.

Conveniently locating transit stops to serve high employment areas, such as this example from Mississauga, can help to generate demand for transit services in areas that are not currently *transit-supportive*.

Strategies:

increase transit use

1. Increase transit use by creating various incentives to use transit for commuting and other trips, including :
   - encouraging employers to provide discounted transit passes to employees, shuttles between the workplace and transit stations and free taxi rides home in case of emergency for employees who take transit to work;
   - providing incentives to developers during the site plan review process such as reduced development charges or parking requirements for incorporating transit stops into designs and providing transit passes to new residents;
   - working with transit agencies to change bus stop locations and route schedules, where needed, to better serve high-employment areas;
   - encourage school boards and schools to undertake school-based TDM approaches which support the use of public transit, *active transportation* and carpooling by students and staff.

increase transportation alternatives

2. Increase the use of other transportation alternatives such as carpooling, *active transportation*, and alternative work arrangements. Strategies could include:
   - providing free and easy-to-use rideshare matching systems to assist commuters in coordinating carpools.
   - encouraging employers, schools, and property managers to provide incentives for carpooling, such as priority parking locations;
   - encouraging flexible work starting times, compressed work weeks, telework, or working from satellite locations; and
   - encouraging employers to provide facilities that make using active transportation a more attractive option, such as secure bicycle parking and shower facilities.

educe single-occupant vehicle use

3. Reduce single-occupant vehicle use through various disincentives, including:
   - encouraging employers to reduce the amount of free parking for employees or to implement charges for parking;
   - reducing development charges for new developments that include reduced parking, provide a mix of uses or that encourage use of transportation alternatives;
   - changing zoning by-laws to define a maximum number of parking spaces, instead of a minimum; and
   - reducing parking availability and increasing parking fees in municipal lots and on municipal streets in areas with good transit access.
4. Implement parking pricing at a district level and adjusting prices periodically to achieve desired levels of demand.
5. Encourage the use of daily parking rates instead of discounted passes and set hourly prices to exceed or equal transit fares.

University Health Network, Toronto

The University Health Network has developed a holistic approach to promoting sustainable commuting practices at its three hospitals, Toronto General Hospital, Toronto Western Hospital and Princess Margaret Hospital. It provides shuttle services from the GO commuter rail Union Station, as well as a proprietary carpool database for all staff. UHN also provides covered and secured bicycle parking facilities and the UHN's Cycling Advisory Committee developed a Cycling Master Plan in 2008 outlining more plans to promote and facilitate bicycle commuting.

University of Ontario Institute of Technology

The University of Ontario's Institute of Technology (UOIT) and Durham College partnered with Durham Region to develop a shuttle service providing connections between local transit and GO Bus service. This gave students a convenient and affordable commuting alternative.

Recommended Resources

TDM Grant Program (Ontario Ministry of Transportation)

Employer Success Stories (Smart Commute)

Carpool Zone (Smart Commute)

Commuter Options: The Complete Guide for Canadian Employers (Transport Canada)

Impact of Transit Improvements on GHG Emissions (Transport Canada)

Improving Travel Options with Transportation Demand Management (Federation of Canadian Municipalities)

Chapter 4

Implementation

This chapter provides an overview of a range of implementation tools that can be used to achieve the principles of these guidelines. It discusses the role of transit agencies and the various planning and policy tools, strategies and processes that play a part in developing more transit-supportive communities including:

- **Inspiring Change**
  Building support and fostering partnerships for transit-supportive uses and transit investments (pg 152)
- **The Planning Process**
  Using existing tools to establish a framework for the creation of a transit-supportive environment (pg 155)
- **Innovative Planning Approaches**
  Exploring new tools for the creation of a transit-supportive environment (pg 160)
- **Funding and Investment**
  Employing strategies to pay for improvements or initiatives that can help to support transit ridership (pg 162)

Inspiring Change

The creation of *transit-supportive* communities requires the cooperation and contribution of many different actors working towards a set of common goals. In some communities, *transit* service or the implementation of transit-supportive land use policies may be new and unfamiliar. Under these circumstances, it is common that people may resist change, particularly when the nature of that change is unknown. Effective communication, consultation and the fostering of partnerships is needed to build greater support for transit and the creation of more transit-supportive communities.

Building support for change by tying the benefits of transit to a larger vision for the community

Build support for transit initiatives by expanding the debate and tying transit initiatives to the achievement of wider community objectives. Broadening the discussion can help municipal planners, transit planners and private developers negotiate polarized views, tie together a range of diverse initiatives and ensure that new investments are coordinated to achieve a range of objectives such as community health, economic competitiveness, growth management, social cohesion or household affordability.

Demonstrating the benefits of transit is particularly important in suburbs and smaller to mid-sized communities where investments in transit or transit-supportive development can be perceived as running counter to the existing character and/or lifestyle choices of the community. Under these circumstances, tying transit-related investments to a strengthening of cherished community characteristics and values such as respect for the natural environment can help to frame change in a holistic light, encouraging a more meaningful discussion of the issues and benefits. Care should also be taken to clearly present the benefits of and need for coordination between plans for transit and land use. Higher densities and more compact urban forms need dependable transit systems and viable transit systems rely on transit-supportive land use; in order to build community support for both transit investments and changes in land use it is important to communicate the interdependent relationship between the two.

There are a number of areas where investments in transit and transit-supportive development can be tied to a discussion of broader community goals including the relationship of transit to:

- Achieving a larger vision for the community: Attaching transit investments, or a change in land use policy in favour of transit, to a community visioning process or the achievement of an existing community vision can help to relate transit initiatives to wider objectives such as the creation or strengthening of neighbourhoods, expansion of housing choice, community sustainability, access to jobs and *place-making*.
- Managing demographic change: Transit investment and creation of walkable communities are long-term strategies that can meet the needs of different population groups and demographic shifts by allowing residents to age in place, providing independent mobility to youth and affordable transportation to new immigrants.
- Community health: Neighbourhood design and access to public transit are increasingly being recognized as significant factors in the promotion of healthy living and improvements to air quality. It has been demonstrated that neighbourhoods that support higher levels of walking and cycling display lower rates of obesity, reducing the risk of diabetes, cardiovascular disease and cancer. Understanding and communicating this relationship can help to tie transit investments and the creation of more transit-supportive environments to broader community health and welfare initiatives.

- Protecting the environment: Many communities are trying to operate more sustainably, reducing their environmental footprint and energy consumption, protecting natural areas and using resources more wisely. These initiatives can all be strongly linked to the provision of transit and higher-density, transit-supportive development.
- Economic competitiveness: By helping to reduce travel times and the associated costs of commuting, transit can ease the movement of goods, reduce household costs and help to attract investment. Investment in transit and related transit-supportive development can help to revitalize areas, bringing underutilized sites into reuse while delivering increased municipal revenues from new property taxes.
- The more efficient use of *infrastructure*: By encouraging more compact development and reducing or eliminating the need to expand infrastructure, transit-supportive development can help to reduce infrastructure costs for the community.

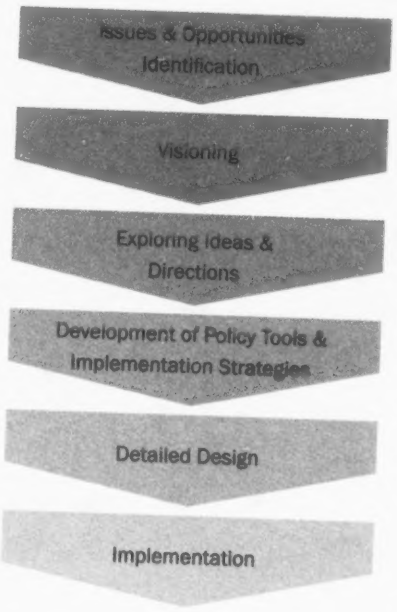
Use the planning process to identify and respond to community issues

The planning process represents a strategic opportunity to engage the public, identify issues and ensure that new investments or policy changes not only help to implement transit improvements but achieve a full range of community benefits. The public engagement process associated with transit investments, including the preparation of *district* plans or *secondary plans*, can help to explore and define the nature of proposed changes and how they can be leveraged to address wider community objectives. Transit investments can be seen as a component of a broader community building initiative and this should be reflected in communication strategies related to transit-supportive initiatives.

Ensure effective public consultation

The introduction of transit infrastructure and creation of transit-supportive communities with a mix of uses and higher densities often means that communities must change. This can sometimes be controversial amongst existing residents. Effective planning and consultation should actively engage all stakeholders in decision-making at every stage of the process to identify solutions and help to address concerns. There are a number of ways that planners, municipalities, transit agencies, developers or others can support public engagement including:

- ensuring representation by various groups and individuals including transit users, local businesses, residents and public stakeholders as processes are initiated, priorities are established and policies are developed;
- engaging stakeholders through a variety of means, such as interviews, open houses, surveys and specific information sessions;
- engaging stakeholders early in decision-making processes and often throughout the duration of a project including the design and construction process;
- establishing community/stakeholder steering committees to ensure public input and community representation; and



The planning process varies widely depending upon the scope and scale of the project but typically includes the stages as illustrated in the process flow chart above. Involving stakeholders early on in the process to identify issues and establish an agreed vision for the project can help to align investments in transit or transit-supportive development with wider community objectives.

- utilizing highly illustrative and clear presentation material to illustrate planned changes, such as 3-D physical models, can give participants a more tangible understanding of what change might mean and allow them to provide more informed feedback.

Foster partnerships

The participation and cooperation of numerous agencies, stakeholders, the development community and various levels of government is a prerequisite for transit-supportive community design. Strategic partnerships can leverage diverse roles and resources to promote and facilitate more transit-supportive environments. This can increase the collective capacity of the development community as well as the approval and regulatory bodies involved in the development process. Examples of strategic partnerships may include:

- a partnership between a transit agency, municipal transportation planning office and a public health unit to produce a communications and/or advocacy campaign on the health benefits of transit-supportive neighbourhoods;
- a partnership between a transit agency, municipal planning office and public health unit to award a developer recognition for championing a transit-supportive and health-promoting development;
- a partnership between a transit agency, municipality and private developer to provide additional density in exchange for an integrated transit stop or station;
- a partnership between a transit agency and a local university to provide discounted transit passes to local students; or
- a partnership between a community arts organization and a transit agency to incorporate local artwork at, or in the design of, transit stops and station areas to enhance user enjoyment and promote local artists.

Change the Culture

Transit investments alone will not necessarily result in a change to transit culture. The Province, *regions*, municipalities and transit agencies can develop and implement a range of training and education tools to promote more transit-supportive communities and encourage transit ridership. These include:

- educational initiatives encouraging implementation of transit-supportive planning, design and ridership initiatives among staff, Council, the development industry and community stakeholders. These could involve workshops, roundtable discussion and working groups that are dedicated to generating solutions for common challenges.
- community-based programs that promote transit use, carpooling, cycling and walking to school or work and for recreation. Fun and informative campaigns can be implemented in partnership with business associations, local newspapers, school boards and local organizations. Examples include cycling clubs, competitions run in association with local businesses, running groups and walking tours.
- collaborative initiatives with public and community health organizations, schools and major employers to encourage transit ridership and underscore the relationship between transit-supportive communities and healthy living.

Economic Impacts of Transit Investment

- The economic benefit of Canada's existing transit systems is at least $10 billion/year.
- Transit reduces Canadian household vehicle operating costs by about $5 billion/year.
- Transit reduces the economic cost of traffic collisions by almost $2.5 billion/year.
- Transit saves about $115 million in annual health care costs related to respiratory illness.

Issue Paper 35: Measuring Success: The Economic Impact of Transit Investment in Canada (Canadian Urban Transit Association)

Recommended Resources

Case Study: Corridor Planning

Case Study: Promoting a Change in Travel Behaviour

Livability in Transportation Guidebook: Planning Approaches that Promote Livability (US Department of Transportation)

Bringing Health to the Planning Table: A Profile of Promising Practices in Canada and Abroad (Public Health Agency of Canada)

Marketing Active Transportation (Transport Canada)

The Planning Process

The planning process, including statutory and non-statutory plans and approvals processes, has a major role to play in ensuring the realization of key principles and strategies highlighted throughout this document. Regional official plans, municipal official plans and *secondary plans* embed *transit-supportive* policies in the municipal planning process and are enforced through zoning by-laws and approvals, including plan of subdivision and site plan approvals.

Ensure upper-tier official plans set the stage for the creation of transit-supportive communities both at the regional and municipal level.

Regional official plans provide regulation and guidance on matters relating to the overall structure of a *region*, mix of uses and the integration of *transit* and transportation by coordinating decisions across multiple municipal boundaries and setting objectives to guide single tier municipal official plans. In many of Ontario's regions, transit is planned and operated by regional bodies and it is often at the regional planning scale where decisions are made with respect to the layout and design of *arterial roads*. Regional plans should:

- address the overall community structure including the identification of designated *settlement areas* and *rural settlement areas*;
- establish *urban boundaries* and structuring elements within settlement areas including *nodes* and *corridors* suitable for *intensification* around existing and planned investments in transit;
- establish land use density and high level built form direction, regional *transportation demand management* (TDM) strategies and policies to encourage a more compact urban form, *infill* and intensification;
- identify regional transit corridors and coordinate them with land use patterns, including identifying density targets for areas along designated corridors;
- encourage seamless transit connections within the region and identify strategies to coordinate services across municipal boundaries; and
- develop transit-supportive arterial road cross sections and prioritize efforts to implement transit-supportive road *infrastructure*.

Incorporate transit-supportive policies into municipal official plans.

Municipal official plans are key tools in the creation of transit-supportive communities. They provide the statutory framework to facilitate a strong connection between land use planning and transit service at the scale of our towns and cities. More than any other policy process or document, the municipal official plan relates directly to the widest array of guidelines within this document. When drafting municipal official plans, it is important to emphasize:

- the clear establishment of local community structure including settlement areas, non-settlement areas, urban growth boundaries, nodes, corridors and *built-up areas*;
- policies related to the establishment of minimum density standards in secondary plans and zoning by-laws capable of supporting the desired level of transit service in different areas of the town or city;
- policies related to the creation of *complete streets* capable of supporting all modes of transportation;
- parking and transportation demand management policies to promote a shift towards higher levels of transit use and more active modes of transportation;
- transit-supportive built form and urban design policies to ensure the creation of a transit-supportive urban form, applicable to both new areas and the retrofit of existing areas to support higher levels of transit ridership;
- transit network design and the relationship between the transit system and land use patterns or major specialized uses within the town or city;

- policies enabling site plan control in areas where transit services exist so that municipalities can evaluate development proposals at a detailed level; and
- the identification of secondary plan areas, particularly at key nodes and corridors where more detailed transit-supportive planning and design direction is necessary for the creation of more transit-supportive environments.

Use transportation master plans to strengthen the integration between land use planning and transit

A transportation master plan outlines policies and establishes a framework of projects and programs to meet the transportation needs of a municipality. As documents that establish the strategic priorities for investment in a municipality's transportation system, they can have a significant impact on transportation patterns within a community and be used to strengthen the integration of land use and transportation policy. Transportation master plans should help to shift *modal split* in favour of walking, cycling and transit use and strengthen the integration of land use and transit by:

- emphasizing the integration of land use and transportation decisions and directing transit investments to support planned areas of higher-density and *mixed-use development*;
- identifying and prioritizing strategic transit initiatives and capital improvements needed to enhance transit service and promote a shift towards higher levels of transit usage;
- identifying deficiencies in land use planning policy that may prohibit planned transit investments;
- encouraging more active modes of transportation through the incorporation of complete street policies and assisting in the development of a comprehensive network of complete streets through the phasing of capital improvements;
- identifying strategies such as the consolidation of access points to support the creation of an interconnected network of secondary streets in employment and commercial centres;
- identifying and promoting transportation demand management measures that promote a shift in modal split to higher levels of walking, cycling and transit usage; and
- coordinating transportation decisions with adjacent jurisdictions to promote the establishment of a seamless regional transportation network.

Create *district*-level plans that provide detailed place-specific policy to guide *transit-supportive development*

District-level plans, including secondary plans and corridor studies, are crucial to guide development of transit-supportive nodes, corridors or specialized uses, providing place-specific planning and design direction. When drafting district level plans, include detailed policy and guidance for:

- the establishment of a transit-supportive *local road* network including the layout and spacing of streets and inter-connectivity with existing street networks;
- supporting access and transit-supportive development both pre- and post- introduction of new transit services, where plans precede investments in transit;
- the planning and design of complete streets within the district to support a range of users;
- enhancing access to area transit, including strategies to improve key connections leading to and from stop/station areas;
- the location and design of transit stops and station areas as well as enhancing transfers between modes of travel;
- built form and urban design to ensure that the area is *pedestrian* and cyclist-friendly and integrated with existing and planned transit facilities;
- the distribution of land uses and densities to ensure that they are supportive of transit services and that stop and station areas contain a mix of uses; and
- parking management, particularly related to the design and location of parking facilities to ensure they do not detract from the pedestrian environment while supporting the function of transit services.

The goals and directions of district level plans can be embedded within a municipality's official plan through the creation of a special policy area and supported through zoning amendments.

Ensure plans of subdivision and condominium plans support long term transit-supportive development patterns

Plans of subdivision and condominium plans set the pattern of land parcels and public rights-of-way. These are important elements that can either establish a transit-supportive pattern capable of accommodating a mix of uses with strong connections to transit or create a disconnected pattern of streets and blocks that limit connectivity, relate poorly to transit facilities and support only a limited mix of uses. Plans of subdivision should:

- be organized to ensure that new uses face onto and help to animate streets, open spaces, and key routes leading to and from transit stop or station areas, working in conjunction with site plan control by-laws;
- establish a pattern of streets and open spaces that are interconnected and organized to strengthen connections between, and relationships with, existing and planned transit facilities;
- delineate land parcels that are of a suitable size and shape to encourage transit-supportive urban form and a range of land uses and densities;
- have regard for the extent to which a plan of subdivision's design optimizes the available supply, means of supplying, efficient use and conservation of energy;
- consider approval conditions to require land dedications for pedestrian and bicycle pathways, public transit rights-of-way, commuter parking lots and transit stations; and
- designate street rights-of-way capable of supporting a broad range of users including pedestrians, cyclists, transit vehicles and private automobiles.

Enact zoning by-laws that support transit-supportive land use and urban design policies

As the mechanism through which municipalities implement policies related to built form, density and land use, zoning by-laws are important tools in the creation of transit-supportive environments. It is vital that zoning by-laws have standards, regulations and metrics related to:

- minimum densities sufficient to support transit use and consistent with density and urban structure policies embedded within the municipal official plan;
- permitted uses linked with planned levels of transit service, encouraging a greater mix of active uses in and around transit stop or station areas while restricting auto-oriented uses such as drive-throughs;
- built form and orientation requiring buildings to actively address streets and encouraging design characteristics to establish a pedestrian-friendly *streetscape*;
- maximum parking standards and alternative parking standards that can be applied in conjunction with the implementation of transportation demand management strategies; and
- transportation demand management provisions such as minimum bike parking requirements that encourage more active forms of transportation.

Use site plan control to evaluate how development applications contribute to transit-supportive environments

As with many planning efforts, the implementation of each individual development or site can have a significant impact on the character and function of a district. This is particularly true when planning for transit, where a poorly designed site can significantly impact access to transit facilities and create an environment which is difficult for pedestrians and cyclists to navigate. Site plan review should be used to evaluate transit-supportive elements including:

- the location and design of parking facilities and driveway access to ensure that they do not conflict with pedestrian access and promote continuous pedestrian streetscapes;
- site/building access and circulation including entrances and orientation to ensure that buildings help to enliven streets and open spaces as well as key connections leading to and from transit;

- transportation demand management (TDM) elements such as preferred parking for *car share* users or bicycle parking/shower facilities;
- the massing and design of proposed buildings including the relationship of buildings to streets, open spaces and transit facilities; and
- the design of new streetscapes and open spaces adjacent to and within development sites, including pedestrian and cycling infrastructure to ensure that they are of a high quality and supportive of a range of users.

The establishment of a checklist or other tool can be helpful in evaluating development applications for impacts on transit-supportive environments.

Involve transit agencies in the planning process

Effective planning for transit-supportive communities requires a comprehensive approach, one that coordinates land use policy, development approvals and implementation with the operational needs of transit agencies.

The inclusion of both planning and operations branches of transit agencies in the development of municipal planning documents is fundamental to ensuring that the spatial organization, mix of uses and development densities are coordinated with existing and planned investments in transit. From a development perspective, the input of transit agencies in the review of applications and amendments can help to ensure that the needs of the transit system are being addressed at the more local level of the stop or station area.

Key areas of involvement include:

Official plans, transportation master plans, secondary plans and district plans

Transit agencies have an important role to play in the development of official plans, secondary plans and district plans, ensuring that the mix of uses and densities are sufficient to support planned levels of transit service and that the layout and design of streets and open spaces is conducive to supporting ridership.

Key areas of input include the:

- identification of the role and objectives for transit service within the community;
- identification of transit needs regarding arterial and *collector road* layout and spacing, local street layout, densities and mix of uses along transit routes;
- development of policies relating to the phasing and timing of future urban development;
- identification of future transit routes, transit nodes and stop locations;
- identification of *intermodal transit hubs*;
- development of modal split targets;
- development of transit service standards, to indicate conditions which should be met prior to extending transit routes;
- identification of overall urban densities required to support desired levels of transit service;
- identification of development densities required at various activity nodes and corridors in the urban area;
- review of proposed densities and mix of uses in development applications to ensure that they are appropriate for projected levels of transit service;
- the development of proposals for future transit stop locations and planning of future space requirements for bus shelters, benches, amenities, compliance with AODA (Accessibility for Ontarians with Disabilities Act) requirements; and
- input into the identification of developer requirements for the installation of basic transit infrastructure, such as bus stop pads.

Zoning by-laws

The review of draft by-laws by transit agencies can help to ensure that regulations regarding lot frontages, densities and permitted uses along transit routes will support the service and financial objectives of the transit agency.

Site plans and plans of subdivision

A review of site plans and plans of subdivision by transit agencies can help to ensure that the broader policies related to transit established at the municipal level are being adequately reflected at the scale of the site.

Key areas of input include:

- providing an assessment of local road layouts, arterial/collector road layouts, analysis of the costs and feasibility of servicing the proposed development (e.g. route length per number of residents served);
- reviewing walking distances to transit stops and ensuring that they are properly sited and designed to enhance user access and comfort;
- providing a review of the proposed staging of development with respect to planned expansion of transit services and the cost/benefits of providing transit services if development is located away from the current transit service area; and
- providing comment on the orientation and design of buildings to ensure that they are appropriately addressing key pedestrian routes leading to and from transit stations and that there is a positive relationship between the location of entrances and transit stops.

In both subdivision and site plan applications, transit agencies should be given the opportunity to recommend changes to initial development proposals. Where major changes to an application are requested by the transit agency, the agency should play a direct role in consultation and negotiation with developers. Transit agencies should also be given the opportunity to review revised plans to ensure appropriate changes have been made.

Ensure that transit-related Environmental Assessment (EA) processes account for infrastructure impacts on the full range of transportation modes and the potential for new transit-supportive development

All public projects including transit infrastructure must comply with the Ontario Environmental Assessment (EA) Act and, if triggered, the Canadian Environmental Assessment Act. Environmental assessment is both a planning and decision-making process used to promote environmentally responsible decisions. This is achieved by considering the potential environmental effects of options and selecting the preferred option in consultation with agencies and the public.
As transit agencies, municipalities or regions perform required EAs, it is useful to:

- incorporate evaluation criteria for alternatives that includes consideration of:
  - the impacts of infrastructure on all modes of transportation;
  - the impacts of infrastructure on surrounding land uses and the potential to create transit-supportive development;
  - the potential effects on the natural, social, cultural and economic environment including potential aboriginal interests; and
- undertake an effective engagement process so that the public understands the impacts of projects and can provide meaningful feedback.

When contemplating a transit project, the transit agency, municipality or region should determine which EA process best applies and may consult with the Ministry of Environment on that decision. The following options are also available for non-dedicated transit projects (where transit will operate in mixed traffic) or when notification is provided to the Ministry of the Environment under Ontario Regulation 231/08 of a Class EA process:

- The streamlined transit EA process in Ontario Regulation 231/08
- The Municipal Engineers Association Class EA: Transit Chapter; and
- If the provincial transportation system is affected, the Ministry of Transportation's Class EA for Provincial Transportation Facilities and GO Transit's Class EA.

Recommended Resources

Case Study: Corridor Planning

Case Study: Creating Complete Streets

Case Study: Creating a Transit-Supportive Community Structure

Ontario Class Environmental Assessments (Ontario Ministry of Environment)

Codes of Practice (Ontario Ministry of Environment)

Ontario's Transit Project Assessment Process (Ontario Ministry of the Environment)

Transit Projects and Greater Toronto Transportation Undertakings, Ontario Regulation 231/08 (Province of Ontario)

Innovative Planning Approaches

Planning, designing and building *transit-supportive* communities often requires new ways of thinking about problems and their solutions. Traditional planning standards and processes, which were developed to manage conventional growth patterns, may need to be re-examined and adapted to support transit-supportive planning and design.

Create an alternative set of development standards and processes for transit-supportive development

The development of a series of alternative transit-supportive development standards can be used to guide public and private investment in designated areas or *districts* such as *nodes* or *corridors*. They can be incorporated into guidelines or official plan policies and include items such as:

- *streetscape* standards designed to encourage higher levels of walking and cycling;
- parking standards such as reduced parking requirements and maximum parking supply;
- building standards such as minimum ground floor height requirements to support more active uses; and
- transportation demand management requirements.

Alternative development standards can help to guide public investment in facilities, streets and open spaces to ensure that they meet objectives related to supporting *transit*. Implementation of standards can be achieved through municipal development approvals processes such as the establishment of plans of subdivision, rezoning processes, official plan amendments and/or site plan approvals.

Use the development permit system to enable faster approvals and greater design flexibility

The development permit system is a land use planning tool that combines site plan, zoning and minor variance processes into a single application and approval process. This can be beneficial for transit-supportive development which often incorporates a greater mix of uses and as a result more complicated building types and classifications. The development permit system is available to all local municipalities and can be applied to all or part of a municipality.

Consider utilizing the development permit system in locations where:

- high quality development is paramount;
- there is a desire to incorporate the provision of discretionary uses under certain conditions;
- there is the desire for a quicker approvals process; and
- more flexible building standards would be beneficial for generating a more transit-supportive development pattern and mix of uses.

Implement multi-modal transportation impact assessments

One of the most common problems associated with standard traffic impact assessments is that they tend to over-value the impact of new development on vehicular movement while discounting new opportunities for increased walking, cycling and transit use. This can be addressed by implementing multi-modal transportation impact assessments that:

- examine the wider catchment area of the stop or station in relation to the proposed transit-supportive development in order to understand the broader transportation issues of the surrounding community;
- require a comprehensive assessment examining impacts on all modes within the transportation network including existing and planned modal split and trip generation rates;
- assess the appropriateness of modal split targets against existing and planned levels of road capacity and levels of transit service;
- explore the impacts of development on existing transit routes in order to identify whether there will be the need for service enhancements such as increased frequency and/or capacity, the addition of new stops or the implementation of transit priority measures;
- consider the potential for transportation options and *transportation demand management* (TDM) measures to mitigate projected traffic impacts, such as improved transit service, *pedestrian* and cyclist-friendly site design strategies and/or other measures; and
- recognize that under some circumstances higher levels of congestion associated with a project can be beneficial, supporting a shift in modal split.

Consider using multi-modal transportation impact assessments as a basis for negotiated agreements between developers and the city to assist in servicing new developments. This could include providing support for capital investments such as new transportation *infrastructure* and/or operation agreements related to the provision of transit service prior to full build-out of development.

City of Calgary Mobility Assessment & Plan

In order to better support and balance all modes of transportation around their light rail stations, the City of Calgary developed an alternative tool, the Mobility Assessment & Plan process. The Mobility Assessment and Plan process:

- engages the community at a higher level than typical transportation studies to identify issues and generate solutions to addressing community concerns;
- assesses existing, medium and long term transportation conditions considering all modes of movement;
- accepts and allows for a higher degree of congestion in the high-density station area and prioritizes pedestrians, cyclists and transit over the private automobile;
- provides a list of hard and soft infrastructure recommendations such as cycling, pedestrian, transit, parking and road network improvements over the short, medium and long term to support planned levels of development; and
- aims to gradually improve walking, cycling and transit quality of service over time in relation to the automobile.

Brentwood Station Area Mobility Assessment and Plan (City of Calgary, Transportation Planning)

Recommended Resources

Ontario Development Permit System (Ontario Ministry of Municipal Affairs and Housing)

Funding and Investment

The development of *transit* and the creation of *transit-supportive* communities require investment. While transit *infrastructure* itself is often funded through large capital funding programs, other less traditional funding mechanisms can be utilized to pay for improvements vital to the creation of transit-supportive communities.

Lead by example

Some of the most successful transit-supportive communities are developed through public sector leadership. Where the province, municipality or transit agency owns land in strategic locations associated with transit, consideration should be given to developing or partnering with private developers to redevelop the area in a more transit-supportive manner.

- Successful development of public lands can set a high standard for private sector development near transit and create an increased market for similar developments.
- Consideration can be given to developing partnerships with private enterprises, where a partial transfer of strategic land holdings can be sold for development and in exchange the developer could create and maintain public amenities such as parks or facilities such as libraries.
- Proceeds from the sale of capital should only be used to reinvest in capital infrastructure or start-up costs to expand services (for example, expanding the bus/train fleet to service a new community). Operating costs, including amortization, need to be supported fully by current and future operating revenue streams.
- Governments may also benefit from increased property tax revenues, as strategic investments in infrastructure may provide an incentive for the private sector to construct new developments or to redevelop existing properties to a higher and better use, resulting in an expansion of the property assessment base.

Establish Community Improvement Plans (CIP)

Community Improvement Plans (CIPs) can be established through appropriate official plan policies and designating by-laws which identify CIP areas. CIPs allow municipalities to make grants or loans to finance certain project costs, typically those with a focus on maintenance, rehabilitation, development and *redevelopment*. CIPs can be used to:

- advance *public realm*, transportation and public infrastructure elements important to creating transit-supportive communities;
- assist in funding the rejuvenation of existing infrastructure;
- promote and stimulate private sector investment in targeted areas; and
- help fund difficult redevelopment sites such as environmentally contaminated *brownfield sites* adjacent to planned investments in transit.

Leverage parking assets into revenue

Municipalities may wish to establish a levy on paid parking locations, including on-street metered parking and/or parking lots. Another effective way to gain revenue from parking is the establishment of a parking authority. A parking authority is a corporation owned by the municipality, whose primary responsibility is the provision of shared commercial (and residential, in some instances) parking, during both on- and off-peak demand hours. Key benefits of parking authorities include:

- costs of operations and maintenance can be covered through parking revenues;

- additional revenues can be reinvested to contribute to the funding of valuable public amenities such as cycling infrastructure or public realm enhancements that can support transit-supportive communities;
- parking supply can be adjusted where appropriate to promote higher levels of transit use;
- overall supply of parking within an area can be reduced in favour of shared parking arrangements; and
- management of spaces can be combined with innovative programming to promote carpooling and carsharing.

Use density and height bonusing to achieve transit-supportive objectives

Section 37 of the Ontario Planning Act permits some forms of height or *density bonusing*. This tool allows buildings to exceed heights or densities permitted by zoning by-laws in exchange for community facilities, services or benefits that do not increase the financial burden on municipalities. Contributions are typically negotiated between the municipality and the developer. Benefits in exchange for height or density could include:

- community amenities such as daycares or cultural spaces that can be located adjacent to transit facilities;
- public realm improvements or amenities that support *pedestrians* such as a plaza or public art; or
- financial contributions to fund community enhancements in and around transit stops or station areas.

Conversely, density bonusing can be an important tool that can be used to help attract investment and the creation of transit-supportive development by rewarding developments that support a community's transportation objectives, helping to promote a shift to higher levels of walking, cycling and transit usage. This can be achieved by specifying and providing incentives to developments that:

- are *infill* in nature or designed to increase densities in areas with higher levels of transit service;
- incorporate specific measures to support transit use such as integration of a transit stop or station entrance into the development; or
- incorporate transportation demand management strategies in line with municipal transportation policy objectives.

Use municipal capital facilities agreements to deliver new transit facilities

Municipalities can enter into municipal capital facilities agreements with other parties, whether public, private, First Nations or not for profit, in order to deliver transit and transit-supportive transportation facilities, such as cycling or pedestrian infrastructure, where this can be done more effectively by an outside party. This can include the provision of a facility, leasing of a facility to a partner, operating a service or facility or maintaining a facility on behalf of the municipality.

Establish municipal services corporations to raise capital for transit projects

Municipalities can establish municipal services corporations for most services and/or facilities that the municipality itself could provide including transit and transit-supportive measures through Section 203 of the Municipal Act, 2001 (and the corresponding Regulation 599/06).

Establishing a municipal service corporation is one way for municipalities to bring in capital to deliver transit, by selling shares in a for-profit municipal services corporation or offering membership in a not-for-profit corporation to deliver transit and transit-supportive services. In addition, municipalities have the authority to use an area rate levy (Municipal Act, 2001 s. 326 (1)(a)) which can be provided to a municipal services corporation for economic development services, such as public transit.

Structure development charges to recoup costs associated with expanding service areas

The Development Charges Act, 1997, allows municipalities to levy charges on new development to help finance the growth-related capital costs of providing roads, transit and other transit-supportive land uses such as daycares, recreational facilities and libraries. Municipalities must undertake a background study to show estimates and calculations used to establish development charges. The study must include a 10-year growth projection, estimates of future service needs and estimates of the cost of the infrastructure required to provide those services.

Municipalities can recoup up to 90% of the costs calculated to pay for transit, parkland development, daycares and recreation facilities through development charges. A municipality may choose to levy a development charge for transit in order to recoup costs associated with the growth of transit in new service areas.

Recommended Resources

Brownfields Ontario (Ontario Ministry of Municipal Affairs and Housing)

Community Improvement Planning Handbook (Ontario Ministry of Municipal Affairs and Housing)

Height and Density Bonusing (s.37) (Ontario Ministry of Municipal Affairs and Housing)

Center for Transit-Oriented Development (Reconnecting America)

Appendix A

Case Studies

The following studies provide examples of how municipalities across North America have attempted to increase ridership through the creation of more transit-supportive communities and the implementation of transit improvement strategies.

01: Corridor Planning

St. Paul Central Corridor Development Strategy

Location: St. Paul, Minnesota

Population: 287,200

Planning Scale: Regional Level

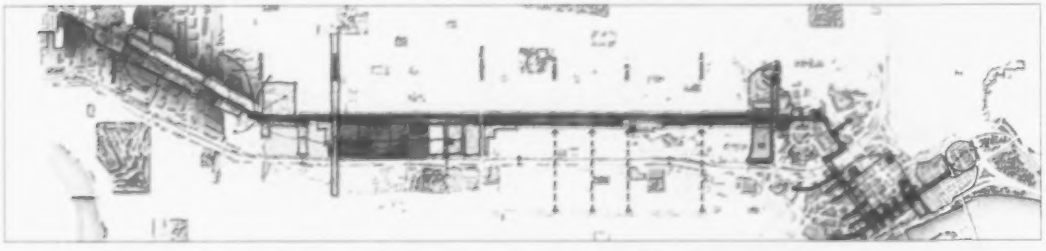
Key Applicable Guidelines: Guideline 1.1.3, *16*, Inspiring Change, *152*, District Level Plans, *156*

Overview

The planned Central Corridor LRT totals 17.5 km with 16 planned stations, providing a direct link between the downtowns of Saint Paul and Minneapolis via a route that traces the most important east-west transportation *corridor* within the *region*.

The City of Saint Paul realized that the $1-billion investment in a new LRT linking downtown Saint Paul with Minneapolis was about more than just moving people from A to B but an opportunity to guide the unique place-making and city-building potential that would result from the investment. Ahead of the transit investment, the City produced a development strategy to guide change and investment along the corridor. The strategy recognized a number of diverse place-making opportunities and identified areas of change and stability along the corridor.

The document establishes a vision and set of strategies for how the central corridor should grow and change over the next 25 to 30 years in response to the LRT investment. The plan broadens the understanding of the specific character, opportunities and challenges inherent along the corridor. It aims to connect *transit* with *pedestrian* and bicycle routes, enhance the role of the arts in neighbourhood life, and prepare a skilled work force to build the rail line itself. The plan was developed through close consultation with community stakeholders.



The development strategy was the result of an extensive consultation process involving interactive open houses and focused round table sessions.

A series of six development types was developed, each with their own unique sets of principles that responded to different conditions along the corridor.

Features

- The strategy connects major activity and employment centres such as the State Capitol campus, the Midway Shopping District and Industrial District, and the University of Minnesota.
- The strategy identified an area of change that responded to both the desire to protect existing stable communities and the unique *redevelopment* opportunities along the route.
- A *public realm* framework helped to identify key public realm improvements that could help to strengthen connections to key destinations on either side of the corridor.
- A series of six development types were identified, each with their own set of development principles that responded to unique development conditions along the corridor. The 6 development types included:
  - Urban Villages which were larger parcels with the potential for new street and block networks;
  - Market Intensification Sites which were existing areas of big box retail;
  - Larger Front and Back Sites which were larger parcels fronting both the corridor and employment areas to the rear;
  - Half Depth Infill Sites which were smaller sites fronting the Central Corridor;
  - Full Depth Infill Sites which were parcels fronting both the Central Corridor and low-rise neighbourhoods to the rear; and
  - Urban Infill Blocks which represented full blocks of redevelopment.
- A transit overlay zone and associated *transit-supportive* zoning ordinance were created for the identified areas of change.

Lessons Learned

- An investment in public transit should be viewed as more than just getting people from A to B but as a unique city-building opportunity with the potential to strengthen communities.
- Major planning efforts injecting significant transit *infrastructure* into communities should involve public consultation. Throughout the nine-month process for developing the strategy, there was an extensive consultation process that involved numerous meetings with *district* task forces, public presentations, open house events, and input from hundreds of community members and business owners.
- An extensive consultation process helped to curb initial community apprehensions and build support for the investment.

Resources

Central Corridor Development Strategy (City of St. Paul)

LRT Station Area Plans (City of Saint Paul)

02: Transit Network Design

Oakville Transit

Location: Oakville, Ontario

Population: 165,600

Planning Scale: Municipal Level

Key Applicable Guidelines: Guideline 1.2.2, ***30***, Guideline 3.1.1, ***96***, Guideline 3.4.3, ***130***

Overview

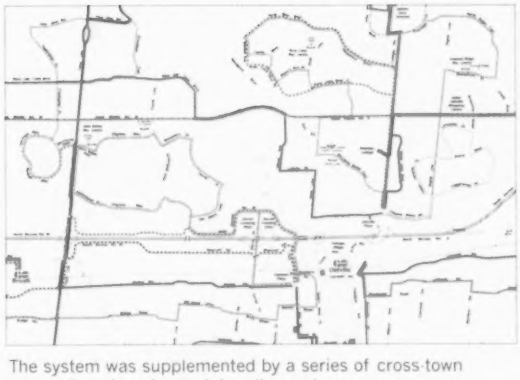
In September 2009, Oakville Transit launched a new service network to offer passengers more direct travel around town and more convenient service. The Town of Oakville originally designed its system 30 years ago, primarily to serve passengers travelling to and from GO Transit stations.

As part of the process, the Town identified a series of *nodes* and *corridors* and made adaptations to the *transit* system so that these were supported by higher levels of transit service.

The new network includes a grid system consisting of six new transit routes running north/south and east/west facilitating faster and more direct travel across and throughout town. The new routes will make regular stops and facilitate connections to other grid and local routes. With the design of a new grid system, some routes have been rescheduled and/or re-routed to avoid duplicating or overlapping of services.

In order to maintain service to more dispersed areas, the Town still operates many of its former routes, which it now refers to as "local routes".

The former transit network radiated out from the regional transit station.



The system was supplemented by a series of cross-town connections to enhance inter-city service.

Features

- Larger, more colourful and more visible bus stop signs.
- 40 new shelters to improve customer waiting areas.
- New terminal at Sheridan College on Ceremonial Drive that provides bus bays for Oakville Transit and GO Transit and improves customer waiting areas with heated shelters.
- Zone Express is a late-night service that meets passengers arriving at Oakville GO Station seven days a week. Passengers board the buses that serve the area of Oakville they wish to reach and tell the driver where they wish to travel. The driver then creates a unique route to take everyone where they want to go.
- A Student Freedom Pass allows students to ride throughout July and August any time of the day for $10 a month.
- Hybrid service network of grid and non-linear bus routes.
- Low-floor buses are fully accessible to passengers who use wheelchairs, scooters, walkers or strollers.
- New grid routes run every 20 minutes during rush hour and every 40 minutes off-peak while service on local routes that cover neighbourhoods has been maintained with some route adjustments. The new grid system has maintained travel times to GO stations, but increased the number of buses serving GO stations.

Lessons Learned

- Grid systems facilitate more direct service to support the identified nodes and corridors (such as at Sheridan College).
- The provision of local community routes can help to maintain service to more dispersed neighbourhoods while providing important feeder service to line-haul routes.
- Monitoring is important. Since the new service was launched, Oakville has been monitoring route times, service delivery and feedback from both Oakville Transit drivers and riders, and adjusting the routes based on that feedback.

Resources

Oakville Transit Routes (Oakville Transit)

03: Creating Complete Streets

Urban Street Design Guidelines, Charlotte

Location: Charlotte, North Carolina

Population: 756,900

Planning Scale: Municipal Level

Key Applicable Guidelines: Guideline 2.2.1, ***44***, The Planning Process, ***155***

Overview

Charlotte consists primarily of auto-oriented post-war era development with many cul-de-sacs in newer neighbourhoods. This results in a poorly connected street network with streets that lack sidewalks or convenient pedestrian routes. In 2007, Charlotte adopted a set of new Urban Street Design Guidelines (USDG), which include detailed design directions for building *complete streets*, to be applied to new and existing streets. The USDG is one of a set of policies intended to transform Charlotte into a more sustainable city and create more context-sensitive streets. Critical to the success of the USDG is its six-step process:

1) Define the land use context;

2) Define the transportation context;

3) Identify deficiencies;

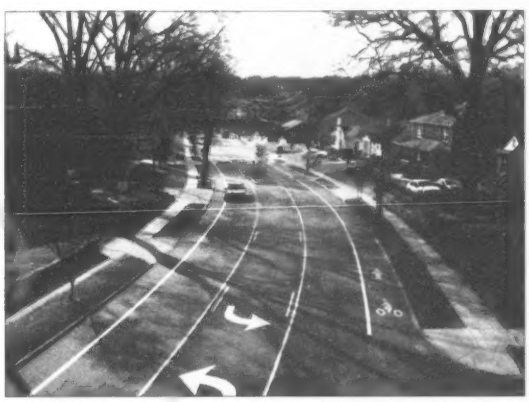
4) Describe future objectives;

5) Define street type and initial cross-section; and

6) Describe trade-offs and select cross-section.

The process ensures that all stakeholders have an opportunity to participate in creating a solution. Rather than merely developing ideal cross-sections, the process seeks to balance the trade-offs that are inevitable when planning a street, and is most beneficial when used during the early stages of planning. At the time of writing, Charlotte had applied the USDG recommendations to eight new thoroughfares, 10 streetscape projects, nine road conversions, 11 rebuilt intersections, and 15 sidewalk projects and has integrated the USDG recommendations into area planning processes for application now and into the future.

An image of the pre-construction, auto-oriented street.



The street post-construction has been designed to calm traffic and support higher levels of pedestrians and cyclists.

Features

- The USDG include a six-step process for designing streets for the interests of all users and land uses. Design trade-offs are systematically examined for every project.
- The USDG provide a diverse set of street types and flexible designs to be applied to various types and intensities of land uses. Additionally, the USDG describe the land uses and urban design elements that can best complement each type of street.
- The USDG is one of Charlotte's many *transit-supportive* initiatives. Others include the identification of centers and corridors, the Transportation Action Plan and the Bicycle and Pedestrian Connectivity Project. Charlotte is also encouraging transit-supportive development to complement their first light-rail line.
- The USDG is being applied during the area planning process. The award-winning South Corridor Station Area Plans were among the first to apply the USDG to select appropriate street classifications, street intervals and street cross-sections based on planned land uses.

Lessons Learned

- Auto-oriented cities like Charlotte can transform themselves with more efficient and sustainable growth patterns. Effective guidelines like the USDG serve as a tool for not only transforming streets, but also creating a more livable city that offers more transportation choices.
- Charlotte is anticipating high levels of growth and sees the USDG policies for streets as necessary to accommodate this growth in a holistic manner.
- Coordination with other smart growth and transportation initiatives helps to strengthen and create an overall transit-supportive environment.
- The six-step process is important for understanding and prioritizing the trade-offs between users and land uses. The process considers all of the different travel modes, but it does not mean equal treatment on all roads.

Resources

Urban Street Design Guidelines (City of Charlotte)

Complete Streets

04: Station Intensification

Brentwood Station

Location: Calgary, Alberta

Population: 1,065,500

Planning Scale: District Level

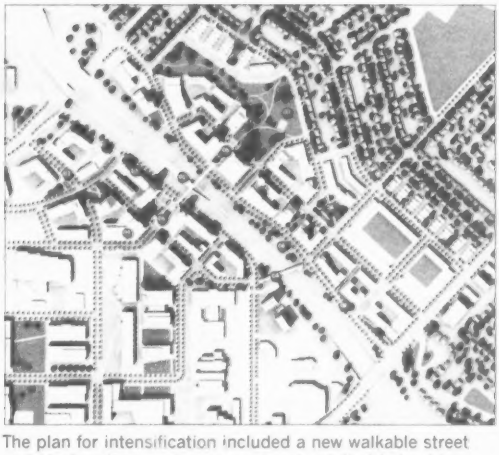
Key Applicable Guidelines: Guideline 1.1.2, ***14***, Guideline 2.1.1, ***40***, Guideline 2.4.3, ***76***

Overview

The Brentwood area is a major transit centre with many bus routes passing through, terminating or originating there. However, it features a fragmented street and sidewalk network and low scale commercial buildings placed within large surface parking lots. The City of Calgary recognized the potential for concentrated growth within the station area and wanted to put in place a plan to guide new development. The plan involved extensive consultation with transit providers as well as local area residents and land owners.

The Brentwood Station Area Plan puts in place a pattern of *intensification*, recognizing that the framework will enable gradual intensification over time. The Plan will support transit through increased densities and improved connections while maintaining the function of the station area and integrating into surrounding neighbourhoods. The station area is both a major employment *node* and a shopping destination, and includes a large park-and-ride facility. The intensification encourages a wide spectrum of uses including shops, restaurants, live-work units, housing, parks, and plazas.

The existing transit station area is defined by large areas of surface parking and auto-oriented uses.



The plan for intensification included a new walkable street and block pattern and *open space network* that helped to enhance connections to adjacent neighbourhoods and employment uses.

Features

- A street and block plan and a proposed open space plan will set the foundation for where public and private development parcels will be located.
- A new integrated, fine-grained street and block network will tie the redeveloping area into the city's existing fabric.
- A new urban square, along with smaller secondary spaces such as transit plazas and linear connections.
- Taller buildings closest to the station transition to lower-rise buildings adjacent to existing residential communities.
- A pedestrian priority area immediately surrounding Brentwood LRT Station, requiring wider required sidewalks and active ground-floor uses, will facilitate a comfortable and attractive place for *pedestrians* and reduce conflicts with automobiles as much as possible.

Lessons Learned

- Intensification does not happen overnight – plans for intensification should enable gradual intensification over time.
- Intensification should achieve its main objective to support transit, but ensure effective integration with the surrounding community.
- Efforts to reurbanize existing *built-up areas* with higher density should be accompanied with a robust and extensive public and stakeholder consultation process.
- Outmoded low-density commercial malls and strip malls show tremendous potential for intensification and intensification to support transit.

Resources

Brentwood Station Area Plan (City of Calgary)

05: Cycling Facilities

Bike Station at Union Station

Location: Toronto, Ontario

Population: 2,503,300

Planning Scale: Site Level

Key Applicable Guidelines: Guideline 2.2.3, **50**, Guideline 2.3.4, **68**, Guideline 3.4.2, **128**

Overview

Bike stations are secure, indoor facilities for storing bikes while passengers are commuting, with full service bike repair stations. The bike station at Union Station is located beneath the commuter and inter-city train platforms. A central body, the Union Station Revitalization Advisory Committee (USRAC), was created to oversee the establishment of the bike station, and the USRAC collaborated with interested members of the public, the Toronto Cycling Committee, and city councillors. The first phase was built in spring 2009, with a total of 180 bicycle parking spaces, change rooms and a washroom. When the remaining two phases are completed, the bike station will have a total of 600 bicycle parking spaces. In addition to the range of facilities on offer, the bike station is also a resource for information on bicycling, walking and public transit in Toronto.

People wishing to use the bike station can either register for a membership at the bike station for a fee of $21.53 for 1 month, $64.57 for 4 months (plus a one-time registration fee of $26.91), or use the Pay and Park service for $2.15, which gives them access to the station for one day. The membership provides some advantages, such as bike station access at all times of the day, free access to the shared bicycles (in case of flat tires or other issues), and a 10% discount at participating bike shops in Toronto.

The bike station at Union Station in Toronto offers a range of services for users including twenty-four-hour parking, video surveillance, repairs, showers, changing rooms, and vending machines, and is staffed throughout the day.

Features

- Change room
- Mechanic stand with tools for customer use
- Vending machine with emergency bike necessities such as tire levers, tubes, patch kits, energy bars, and beverages
- Secure "man-trap" door system to prevent non-members from entering the bike station
- 24 hour video surveillance
- Daytime staff

Lessons Learned

- Bike facilities are most beneficial when integrated into a system-wide strategy for providing safe and convenient bicycle access between communities and their transit stations. The provision of a bike station at Union Station provides an opportunity for suburban commuters to safely leave bicycles over night and use them to commute from Union Station to and from work during the day.
- Developing diverse partnerships can help to build support for cycling facilities and increase the number of users.

Resources

Bicycle End-of-Trip Facilities: A guide for Canadian municipalities and employers (Transport Canada)

Toronto Bicycle Station (City of Toronto)

Bicycle Station Case Study (Transport Canada)

06: Targeting Transit Service

Grand River Transit (GRT)

Location: Region of Waterloo, Ontario

Population: 473,700

Planning Scale: Regional Level

Key Applicable Guidelines: Guideline 3.1.1, **96**, Guideline 3.1.3, **104**, Guideline 3.3.2, **118**

Overview

Grand River Transit (GRT) is the public transit agency for the Region of Waterloo, Ontario. It operates daily bus services primarily in the tri-cities of Kitchener, Waterloo, and Cambridge, travelling about twelve million km/year. The Region is a rapidly growing mid-sized metropolitan area. Transit ridership has traditionally been low because of low-density land uses, high auto ownership, and widely available parking. In recent years, GRT has increased its ridership by introducing innovative strategies aimed at addressing the region's diverse service needs. This includes the provision of an express bus service with a real-time passenger information system, new low-floor, wheelchair-accessible buses, bus service tailored to the needs of low-density suburban neighbourhoods, and bicycle racks on the front of its buses.

The iXpress is an express bus service that provides quick travel along a 35 km central *corridor* through the region's urban centre. It links the Tri-City downtowns with the two universities, regional hospital, and shopping centres. The system is supported by EasyGO, a real-time passenger information system that is accessible by web, phone and text messaging, and is part of a larger *transportation demand management* strategy.

MobilityPLUS is a specialized service for pre-booked trips that provides accessible services for persons with physical and cognitive disabilities. An event was held to promote and teach the community about the new accessible transit features. Buses were available at the event for those with mobility aids to test out the low-floor buses. The region's busPLUS service uses smaller vans to serve areas of low ridership in new subdivisions.

Following the implementation of EasyGO features, average daily use more than doubled between June 2008 and September 2008. Online survey results have been positive and suggest a strong relationship between ridership growth and implementation of the EasyGO system.

The GRT event, called "RAMP", provided people with mobility aids an opportunity to test the new low-floor buses and ask questions.

The new bus shelters along the iXpress routes contain EasyGO displays to provide real-time departure times for buses. Bike racks are provided adjacent to the shelters to encourage people to ride to the stops, which are spaced further apart than for non-express routes.

Features

- iXpress bus service carries over 8,500 riders daily and includes an *automatic vehicle location* system and passenger counting system.
- The EasyGO Traveller Information System includes:
  - a web-based trip planner to plan trips using landmarks, bus stops, addresses or intersections;
  - text messaging to receive the next three scheduled times the bus will be at a particular stop;
  - next bus call that provides scheduled times for the next buses at that stop;
  - visual and audible in-vehicle announcements of upcoming stop information; and
  - station/terminal displays that provide real-time departure times.
- EasyGO was developed in coordination with existing transit strategies and guided by policy initiatives including the Regional Transportation Master Plan, the Regional Growth Management Strategy, and the Growth Plan for the Greater Golden Horseshoe.
- The TaxiSCRIP program is for people who are registered with MobilityPLUS, and allows passengers to book service directly with a local taxi company and pay with TaxiSCRIP coupons.
- The busPLUS service uses a van in new lower-density neighbourhoods to pick up customers and drop them off at designated busPLUS stops.

Lessons Learned

- Providing effective transit service across a diverse range of environments requires an equally diverse range of transit services.
- Partnering with private services such as taxi companies can help to extend the reach and convenience of demand responsive transit services.
- Coordinating transit strategies with existing policy initiatives can help to plan transit services to meet the diverse needs of a community and grow ridership.

Resources

Grand River Transit

EasyGO Traveller Information System (Transport Canada)

07: Rural Transit

Central Texas Capital Area Rural Transportation System (CARTS)

Location: 19,400 km² surrounding Austin, Texas

Population: Approx. 1,026,000

Planning Scale: Regional Level

Key Applicable Guidelines: Guideline 1.1.6, **22**, Guideline 3.1.1, **96**, Guideline 3.1.3, **104**

Overview

The Capital Area Rural Transportation System (CARTS) is a public agency formed by nine county governments surrounding Austin, Texas, covering an area of over 19,000 km². CARTS delivers customized transportation for 169 communities. In addition to the fixed routes that the city buses travel on, a curb-to-curb service allows customers to schedule rides. Passengers can board a CARTS bus from their home, be taken to their destination and back home. Sixty mini-buses and vans operate this flexible service.

CARTS buses operate from five transit stations, located strategically throughout the *district*. These centres are located in Austin, Bastrop, Round Rock, San Marcos and Smithville. There are plans to open two more centres in Williamson and Taylor, and more are expected for the future.

Curb-to-curb fares are set based on three zones and are based on a one-way trip. One-way fares are $2 for a trip within town, trips within a county are $4 and inter-county travel costs $6. CARTS operates on a $5 million annual budget and is funded with state and federal dollars. About 549,000 people in the nine counties use this service and about 350,000 trips are made per year.

The Central Texas Capital Area Rural Transportation System serves nine counties and covers 19,400 km².

The buses are operated from five transit stations located throughout the area.

Features

- Persons with disabilities, persons over age 60, and children aged 12 and under are eligible for half-fare.
- CARTS contracts with third parties like Medicaid and mental health centres to provide medical transportation for clients.
- All fixed route services offer wheelchair-accessible vehicles.
- Electronic signboards display exactly when the next bus arrives at the transit station and two of the major stops.
- Re-loadable electronic fare cards can be purchased on the CARTS web site as well as at stations.
- The curb-to-curb service uses a radio-data communications network and computer-assisted scheduling. CARTS provides advance reservation.

Lessons Learned

- Inter-jurisdictional cooperation is essential to making rural transportation systems work. Collaboration between the nine county governments provides a regional perspective and planning for the community-based passenger transportation services it operates, allowing for community-tailored service.
- Real-time information displayed on electronic signboards increases efficiency and convenience for passengers.
- Coordination is key to CARTS' operation. Numerous health and human service agencies contract with CARTS for transportation services for their clients. CARTS also provides vehicles and vehicle maintenance services to several human service agencies, and the Round Rock Parks and Recreation Department.

Resources

Capital Area Rural Transportation System (CARTS)

Regional Transportation Coordination Plan for the Capital Area (Capital Area RTCC)

08: Small to Mid-Sized Community Transit

North Bay Transit

Location: North Bay, Ontario

Population: 53,000

Planning Scale: Municipal Level

Key Applicable Guidelines: Guideline 3.5.3, **142**, Guideline 3.5.4, **144**

Overview

The City of North Bay is a smaller mid-sized community where traffic is light and driving distances are relatively short, making it at times a difficult market for *transit* services. To overcome these challenges, North Bay Transit has instituted a variety of programs aimed at enhancing the efficiency of existing services and attracting new ridership.

The city is an active participant in the Canadian Urban Transit Association (CUTA)'s SmartDRIVER training program. The program aims to enhance driver safety by promoting more defensive driving skills and teaching driving techniques to increase the efficiency of vehicle operations. Through initiatives such as a driver competition aimed at who could save the most fuel, the program has been very successful, resulting in a reduction in fuel expenditures, lower maintenance costs and an enhanced rider experience resulting from smoother vehicle operations.

In response to a parks and recreation survey which had identified that community youth were reluctant to try transit due to a lack of familiarity with the system, the city introduced the Go Green on the Bus (GGOB) program aimed at de-mystifying transit use and promoting increased student ridership. The transit agency created a student package containing a range of useful information and incentives such as telephone numbers, a list of frequently asked questions and answers and 5 free rides to get students familiar with their services. A specially designed transit map that students could fit into their wallets was also created identifying key points of interest such as sports fields, community facilities and shopping destinations. North Bay Transit actively seeks partnerships and provides incentives where they can be demonstrated to increase ridership and provide mutual benefit to both the agency and partnering organization.

North Bay Transit's Go Green on the Bus (GGOB) program used a dedicated web site to reach student riders, educate them about the benefits of transit use and provide them with information about transit services.

Features

- North Bay Transit was actively involved in the implementation of CUTA's SmartDRIVER training program which teaches defensive skills and more efficient driving techniques. This has resulted in fuel and maintenance savings as well as an enhanced rider experience.
- The GGOB program was designed to actively target students and included in-school presentations and a specially designed student package to encourage greater student ridership.
- A partnership formed with school co-op teachers provided discounted tickets in return for increased transit use by students going to and from placements. Prior to the program students typically used taxi services.
- A corporate employee program provides discounted monthly passes in exchange for guaranteed minimum uptake.

Lessons Learned

- Partnerships take commitment and coordination by all parties involved. Delays in getting into high schools early in the year led to reduced uptake and difficulties in evaluating the success of the GGOB program in its first year.
- In-house incentives such as front line worker competitions can help to implement changes.
- Tying individual strategies to larger policy initiatives can help to relate transit services to larger community objectives. Both the GGOB and SmartDRIVER programs were attached to a larger sustainability strategy. This along with other initiatives such as the use of employee transit passes and environmentally friendly cleaning materials have helped North Bay Transit to brand the agency not only as a transit service provider but a sustainable solution.

Resources

North Bay Transit

Go Green on the Bus (North Bay Transit)

SmartDRIVER for Transit (CUTA)

09: Mid-Sized Community Rapid Transit

EmX Bus Rapid Transit, Eugene, Oregon

Location: Eugene, Oregon

Population: 149,000

Planning Scale: Municipal Level

Key Applicable Guidelines: Guideline 2.2.5, **56**, Guideline 3.1.1, **96**

Overview

Eugene began discussions about new transportation options in 1996 as part of a regional transportation plan update. *Bus rapid transit* (BRT) was selected because the scale and cost was appropriate for their community size, and because it could be developed one line at a time as demand and funding allowed. Eugene's BRT line, EmX, replaced an existing bus route and very quickly saw a dramatic increase in ridership.

EmX offers nearly 19 km of BRT service along Franklin Boulevard, a major east-west *corridor*, linking downtown Eugene and downtown Springfield, a neighbouring city. The corridor was selected because of its high traffic volume, population density, and heavy transit ridership. By linking two major *nodes*, the Eugene Station and the Springfield Station, the Franklin EmX formed the spine along which all future EmX lines will be based. The EmX line is integrated into a region-wide bus network in the Lane County Transit District.

Sixty percent of this corridor consists of exclusive bus lanes which allow EmX to operate efficiently, even in high-traffic situations. Bus ridership in Eugene increased 35-40% in a three-year period, and a rider survey revealed that around 64% of riders choosing EmX had a car accessible to them. The success is attributed to key transit priority features such as dedicated bus lanes, new transit stations with local station art, high service frequency, and low-floor buses for efficient boarding.

High quality transit stations, buses and infrastructure helped to enhance the image of the system and grow ridership.

Transit priority and dedicated rights-of-way enable the buses to move efficiently along congested portions of the corridor.

Features

- Dedicated bus *rights-of-way* along 60% of the route.
- *Signal priority* gives buses priority through intersections.
- Low-floor buses make boarding easier.
- Off-board fare collection speeds up boarding.
- Improved stations including eight new shelters built along original route.
- Higher service frequency: peak 10 minutes, off-peak 20 minutes.
- Integrated with local network of bike paths.
- A transit pass system with the University of Oregon; incidental fee allows free bus rides with a University ID.
- Local jobs were created by hiring local contractors to design and construct key *infrastructure* components.
- Hundreds of community members, including civic leaders, business owners, and environmental and neighbourhood groups were involved in open houses that were used to gather feedback and to inform corridor planning and design.

Lessons Learned

- Partnerships with local universities, schools and medical institutions help provide low-cost service.
- High-quality infrastructure and transit priority measures such as signal priority and dedicated rights-of-way are strategies to help grow transit ridership.
- The sensitive selection and planning of the pilot BRT corridor led to its success, and has enabled the extension of the BRT line to two other corridors in West Eugene and Springfield.

Resources

EmX (Lane Transit District)

10: Right-Sizing Transit Systems

San Francisco Municipal Railway (Muni)

Location: San Francisco, California

Population: 809,000

Planning Scale: Municipal Level

Key Applicable Guidelines: Guideline 3.1.1, **96**

Overview

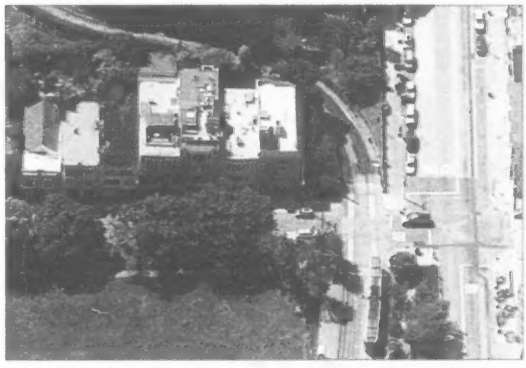
San Francisco's Muni operates 80 routes throughout the city with a fleet composed of streetcars, LRTs, trolley coaches, buses and cable cars – it is one of the most diverse in the world and sees more than 200 million transit riders a year.

The city's LRT system has been designed to respond to San Francisco's diverse environments, including running below grade through the downtown, running mixed with traffic through residential areas, through parks, and along dedicated stretches as needed. By designing the rail system to run within a variety of configurations, the same streetcar is able to serve both the dense core of the city as well as many of the smaller *main street* areas to the south.

Below-grade condition

Dedicated condition

Mixed with traffic



Dedicated off-street condition

Features

- Streetcars are designed to work both underground as well as at grade on the street with retractable stairs that provide level access in underground stations and street stair access along city streets.
- A range of transit priority measures are put into place and vary according to local context including dedicated tunnels beneath the city centre, stretches of dedicated right-of-way along busy streets, open space corridors and in mixed traffic in smaller neighbourhood settings.
- Flexible LRT routes are served by a comprehensive network of feeder buses that together ensure that over 90% of the city is within 2 blocks of a transit stop.
- The Muni only serves places within the San Francisco city limits, but is integrated into a regional transit system that connects with Bay Area Rapid Transit (BART), SamTrans, and AC Transit.

Lessons Learned

- Transit *corridors* do not have to be a one-size-fits-all solution – design elements and transit features can vary along the length of a corridor to respond to its environment.
- Transit priority measures can respond to the places they run through, supporting the local context rather than overriding it.
- The integration of a range of transit service types including rapid transit and on street feeder services can facilitate wider system coverage and support higher levels of ridership on dedicated rapid transit or *line-haul* routes.

Resources

San Francisco Municipal Transportation Authority

11: Growing Transit Ridership

Winnipeg Transit

Location: Winnipeg, Manitoba

Population: 633,500

Planning Scale: Municipal Level

Key Applicable Guidelines: Guideline 1.1.7, **24**, Guideline 2.2.5, **56**, Guideline 3.2.1, **108**

Overview

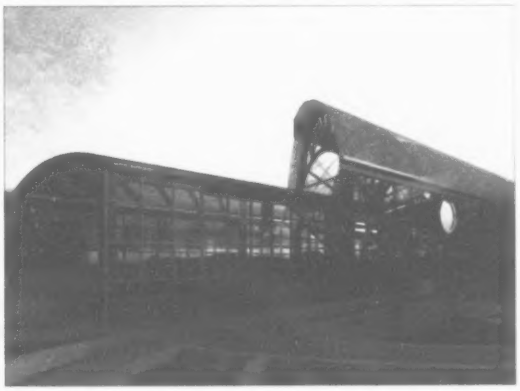
In 2006, Winnipeg gained Council approval for a capital budget to implement a comprehensive multi-year transit improvement initiative for 2007-2012. Winnipeg Transit has since implemented significant enhancements to improve the speed, reliability, comfort, accessibility and the communication of its *transit* service. The plan consists of an integrated set of improvements in specific "Quality Corridors", tailored to meet the needs of each area.

In 2008, a funding agreement for $138 million was announced for construction of the first phase of the Southwest Rapid Transit Corridor project, a rapid transit system for Winnipeg. The project is funded by a combination of municipal, provincial, and federal funding programs.

A network of transit routes will use this new *infrastructure* and existing transit priority measures to provide fast, reliable transit service between the downtown and the southwest part of the city. The first phase will be constructed between 2009 and 2011. The plan will link Winnipeg with a number of *nodes* composed of mixed residential and commercial development.

Public reaction to the improvements has been very positive. System ridership has continued to grow steadily, from 42.6 million in 2008 to 43.9 million in 2009.

Low floor, low emission buses enhance accessibility along with the image of the transit system.



A new rapid transit network linking the downtown with a number of existing and planned *mixed-use* hubs will help to enhance access to a range of uses and support ridership.

Features

- Upgrades to over 500 stops with new shelters (many heated), signage, benches, and landscaping.
- New on-street transit priority measures (diamond lanes, transit *signal priority*, queue jumps) to improve speed and reliability.
- New Park & Ride facilities.
- New buses with low floors for accessibility and low emission engines.
- iBUS technology to provide automated vehicle location, schedule adherence monitoring, "next stop" display/announcements, security cameras, and *automatic passenger counters*.
- A new control centre system provides service monitoring and incident management tools to better manage daily transit operations.
- Real-time passenger information is provided through an online trip planner, an improved TeleBUS system, text messaging, electronic signs at major stops, a smartphone web application and Twitter feeds.

Lessons Learned

- Enhancing speed, reliability, comfort, accessibility, and information are all highly valued by commuters and ensure that transit remains competitive with other modes of transportation.
- Targeting improvements to meet the needs of specific service corridors can help to make the most of limited resources.

Resources

Improvements Program (Winnipeg Transit)

12: Promoting a Change in Travel Behaviour

GO Boulder

Location: Boulder, Colorado

Population: 100,200

Planning Scale: Regional Level

Key Applicable Guidelines: Guideline 3.1.1, **96**, Guideline 3.5.3, **142**, Guideline 3.5.4, **144**, Inspiring Change, **152**

Overview

GO Boulder, the Boulder *region*'s transportation agency, has been working to create a transportation system that sustains the city's quality of life while providing a range of travel options for its residents. In support of this, the city's Updated Transportation Master Plan (TMP) encourages a shift in movement patterns away from the single-occupant vehicle to alternative transportation modes such as public *transit*, cycling and walking.

To support this shift in travel behaviour a range of innovative programs have been implemented. These include:

- the development of a Community Transit Network of high frequency mini buses;
- enhanced user amenities such as shelters and real-time transit schedule displays;
- promoting and enhancing the Eco Pass program aimed at business, neighbourhoods and students; and
- developing marketing and educational materials to promote higher levels of walking, cycling, and transit use.

GO Boulder proactively collaborates with regional partners including the local business community and other constituents to provide convenient travel choices to employees and customers and promote innovative work programs such as flextime and teleworking to reduce single-occupant vehicle trips. A key element of the marketing of alternatives to the single-occupant vehicle has been the inclusion of the public in the community design process. This has enabled residents to provide meaningful input into the selection of transportation options within the TMP and has helped to build greater community support for initiatives.

Each bus has graphics designed by users of the route and includes services that are designed and timed to address neighbourhood ridership characteristics.

GO Boulder has taken a holistic approach to promote a shift from single-occupant vehicle use by encouraging more active modes of transportation such as walking and cycling.

Features

- The Community Transit Network offers convenient transit options by using smaller vehicles more suitable to the ridership levels of lower-density neighbourhoods.
- The Eco Pass is an annual bus pass that is purchased by employers, providing employees with unlimited rides on most regular transit services. The Eco Pass also comes with the Guaranteed Ride Home program, which guarantees any individual with the pass a free taxi ride home if they have taken the bus, bike, or car/*vanpool* to get to work and have an unplanned emergency and need to get home. GO Boulder and the City of Boulder will rebate $60 per employee for a company of 1 - 9 employees for their first year contract and $30 per employee for a company of 1 - 9 employees for their second year contract
- GOBikeBoulder is a pilot program funded by a federal grant and GO Boulder and the City of Boulder that makes it easy to find the best bike route around Boulder for getting from one place to another.
- GOSmartBoulder is a marketing campaign that works with residents of North Boulder to help them learn more about transportation resources in order to encourage and support a change in travel behaviour.

Lessons Learned

- Partnerships between businesses and transit providers can be used to attract quality employees and increase employee recruitment and retention.
- Pilot testing used for most of the Go Boulder programs allowed for the evaluation of each new program prior to fuil implementation. This allowed planners to identify strengths and shortcomings, make adjustments, and determine whether to implement the program permanently.

Resources

GO Boulder

13: Creating a Transit-Supportive Community Structure

City of Ottawa

Location: Ottawa, Ontario

Population: 812,100

Planning Scale: Municipal Level

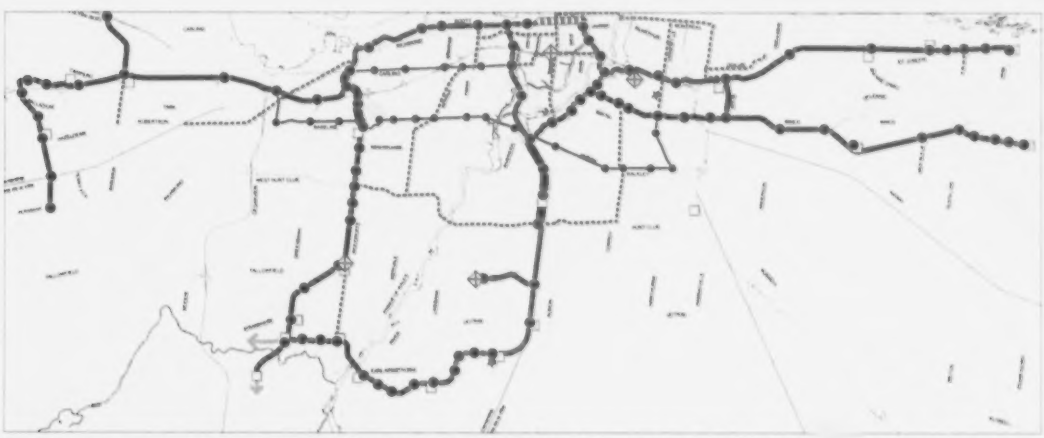
Key Applicable Guidelines: Section 1.1, **10**, Guideline 1.2.2, **30**, The Planning Process, **155**

Overview

Ottawa's population is projected to grow by 30 per cent or approximately 145,000 new homes by 2031. To accommodate this new growth in a manner that is more *transit-supportive*, the City of Ottawa's 2003 official plan directs growth to key locations served by existing and planned *transit* services. The approach is intended to ensure that new development supports the efficient delivery of transit service and that there is a cost-effective pattern in place for the long-term provision of municipal services and *infrastructure*.

Within the designated *urban boundary*, growth will be directed to a series of higher-density, *mixed-use nodes* and *corridors*. The central area will remain the focus within the transit system, containing the highest density development. Radiating out from the central area is a planned linear network of *main street* corridors. These are intended to accommodate cross-town transit commuters and act as local destinations within the system.

Complementing and at times paralleling these corridors is a planned dedicated rapid transit network. Major stations within the network are to anchor a series of higher density, mixed-use nodes designated as Mixed-Use Centres and Town Centres within the plan. These concentrations are to act as "mini-downtowns", seeking to support and take advantage of the higher volume of transit riders by providing high-density, high-rise employment and residential development opportunities in an environment that is supportive of walking and cycling.



The City of Ottawa Rapid Transit Network identifying light rail (red) and bus rapid transit (blue) corridors and stations. Target areas for intensification with density targets were established around key transit nodes in order to support the transit system.

Features

- Target areas for *intensification* are focused on major elements of the rapid transit network, including the central area, mixed-use centres, main streets, and town centres.
- Arterial main streets will have denser development to support frequent transit service and prepare them for a higher level of transit.
- The City will also promote intensification for lands within 600 m of future or existing rapid-transit stations and lands that are no longer viable for the purpose for which they were intended, such as older industrial areas or abandoned transportation corridors.
- Ottawa's target for intensification, defined as the minimum proportion of new residential growth in the urban area to be achieved through intensification, is 40% of new dwelling units, averaged over the 2006-2031 time period.
- Monitoring and reporting annually on the pattern and amount of residential and non-residential intensification will be related to the assumptions upon which the citywide and minimum targets associated with the target areas are based.
- To support the transit-supportive policies in the Official Plan, the City has created a series of Transit-Oriented Development Guidelines, to be applied throughout the city, for all development within 600 m of a rapid transit stop or station.

Lessons Learned

- Transit and land use planning should be an iterative, integrated process that coordinates transit decisions alongside an understanding of existing and planned patterns of land use and similarly supports transit decisions through land use strategies.
- As cities grow it may be necessary to move from a radial transit network to more of a grid system capable of serving more multi-nodal development.
- Planning to support nodal and corridor related intensification should be supported through larger growth initiatives aimed at increasing levels of intensification within *designated growth areas*.
- The creation of design guidelines can help to clarify transit-supportive policies, providing direction and communicating transit-supportive concepts for planners, developers and members of the wider community.

Resources

Ottawa Official Plan (City of Ottawa)

Ottawa Transit Map (City of Ottawa)

Transit-Oriented Development Guidelines (City of Ottawa)

Appendix B

Acknowledgements, References and Photo Credits

This section contains the acknowledgements, a detailed list of the resources, and a list of credits for photos that were used in this document.

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References

Chapter 1: Community-Wide Guidelines

Alameda-Contra Costa Transit District. 2004. *Designing with Transit.*

APA. 2006. *Planning and Urban Design Standards.*

Calthorpe, P. 2002. *The Urban Network: A Framework for Growth.* http://www.calthorpe.com/files/Urban%20Network%20Paper.pdf

The Centre for Sustainable Transportation. 2009. *Child and Youth Friendly Land-use and Transport Planning Guidelines in Rural Areas.* http://www.centreforsustainabletransportation.org/documents/GuidelinesforManitoba3.pdf

City of Calgary. 2009. *Brentwood Station Area Redevelopment Plan.* http://www.calgary.ca/DocGallery/BU/planning/pdf/tod/brentwood/brentwood_sap.pdf

City of Calgary. 2010. *Southeast 17 Corridor Study – Land Use and Urban Design Concept.* http://www.calgary.ca/docgallery/bu/planning/pdf/southeast_corridor/se_seventeen_ave_corridor_plan.pdf

City of Calgary. 2010. *Southeast 17 Corridor Study – Planning.* http://www.calgary.ca/docgallery/bu/planning/pdf/southeast_corridor/se_seventeen_ave_corridor_plan.pdf

City of Denver. 2006. *Transit Oriented Development Strategic Plan.* http://www.denvergov.org/Portals/193/documents/full%20tod%20st%20plan%20.pdf

City of Ottawa. 2003. *Official Plan.* http://www.ottawa.ca/city_hall/ottawa2020/official_plan/index_en.html

City of Ottawa. 2008. *Road Corridor Planning and Design Guidelines.* http://www.ottawa.ca/residents/planning/design_plan_guidelines/completed/road_corridor/road_corridor_en.pdf

City of Ottawa. 2007. *Urban Design Guidelines for Greenfield Neighbourhoods.* http://www.ottawa.ca/residents/planning/design_plan_guidelines/completed/greenfield/greenfield_en.pdf

City of Saint Paul. 2007. *Central Corridor Development Planning & Strategy.* http://www.stpaul.gov/index.aspx?NID=156

City of Toronto. *Avenues and Mid-Rise Buildings Study.* http://www.toronto.ca/planning/midrisestudy.htm

City of Toronto. *Tall Buildings Study.* http://www.toronto.ca/planning/tallbuildingstudy.htm

City of Toronto. 2003. *Infill Townhouse Guidelines.* www.toronto.ca/planning/urbdesign/pdf/townhouseguideline.pdf

Communities and Local Government. 2004. *Planning Policy Statement #7: Sustainable Rural Development.* http://www.communities.gov.uk/documents/planningandbuilding/pdf/147402.pdf

Durham Region. 2007. *Arterial Corridor Guidelines.*

Florida Department of Transportation. 2009. *Best Practices in Transit Service Planning.* http://www.nctr.usf.edu/pdf/77720.pdf

IBI Group. 2007. *Transportation trends and outlooks for the Greater Toronto Area and Hamilton: Strategic transit directions.* https://ospace.scholarsportal.info/bitstream/1873/10165/1/279338.pdf

Macleod Institute. 2003. *Bow Corridor Regional Mobility Strategy.* http://www.macleodinstitute.com/projects/Web%20Work/

Municipal Research & Services Center of Washington. 1997. *Infill Development – Strategies for Shaping Livable Neighborhoods.* http://www.mrsc.org/publications/textfill.aspx

Ontario Ministry of Culture. *Ontario Heritage Tool Kit.* http://www.mtc.gov.on.ca/en/heritage/heritage_toolkit.shtml

Ontario Ministry of Infrastructure. 2006. *Growth Plan for the Greater Golden Horseshoe.* https://www.placestogrow.ca/images/pdfs/FPLAN-ENG-WEB-ALL.pdf

Ontario Ministry of Infrastructure & Ministry of Northern Development Mines and Forestry. 2011. *Growth Plan for Northern Ontario.* https://www.placestogrow.ca/images/pdfs/GPNO-final.pdf

Ontario Ministry of Municipal Affairs and Housing. *A Practical Guide to Brownfield Development in Ontario.* http://www.mah.gov.on.ca/AssetFactory.aspx?did=4995

Ontario Ministry of Municipal Affairs and Housing. *Brownfields Ontario.* http://www.mah.gov.on.ca/Page220.aspx

Ontario Ministry of Municipal Affairs and Housing. 2005. *Provincial Policy Statement.* http://www.mah.gov.on.ca/Asset1421.aspx

Ontario Ministry of Transportation. 1985. *Geometric Design Standards for Ontario Highways (GDSOH) manual (most recent edition).* https://www.publications.serviceontario.ca/ecom/

Ontario Ministry of Transportation. Ontario Traffic Manual. http://www.library.mto.gov.on.ca/webopac/search.asp?mode=search

Oregon Department of Transportation. *Oregon Regional Transportation Plan.* http://www.oregon.gov/ODOT/TD/TP/ortransplanupdate.shtml

Oregon Metro. *Urban Growth Boundary.* http://www.metro-region.org/index.cfm/go/by.web/id/277

Portland Metro Council. 2000. *2040 Growth Concept.* http://www.oregonmetro.gov/index.cfm/go/by.web/id=29882

Transit Cooperative Research Program. 2008. *Effects of TOD on Housing, Parking and Travel.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_128.pdf

Transit Cooperative Research Program. 1996. *Guidelines for the Location and Design of Bus Stops.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_19-a.pdf

Transport Canada. 2004. *Early Transit Phase-In Policy: Promoting Transit in Growing Communities.* http://www.tc.gc.ca/eng/programs/environment-utsp-earlytransitphaseinpolicy-843.htm

Transportation Association of Canada. Geometric Design Guide for Canadian Roads.

Transportation Research Board. 2009. *Guidebook for Change and Innovation at Rural and Small Urban Transit Systems.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_70a.pdf

Transportation Research Board. 1999. *Guidelines for Enhancing Suburban Mobility Using Public Transportation.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_55-a.pdf

Transportation Research Board. 2010. *Public Transport Network Planning: A Guide to Best Practice in New Zealand Cities.* http://www.nzta.govt.nz/resources/research/reports/396/index.html

York Region Transit. 2006. *Transit Service Guidelines.* http://www.yrt.ca/assets/pdfs/2006_Transit_Guidelines.pdf

Chapter 2: District-Level and Site-Specific Guidelines

Arlington County Department of Environmental Services. *Transportation Demand Management for Site Plan Development.*

Bay Area Metropolitan Transportation Commission. 2007. *Toolbox/Handbook: Parking Best Practices & Strategies For Supporting Transit Oriented Development In the San Francisco Bay Area.* http://www.mtc.ca.gov/planning/smart_growth/parking_seminar/Toolbox-Handbook.pdf

Bay Area Open Space Council. *Transit and Trails.* http://www.transitandtrails.org/

Bay Area Rapid Transit. 2002. *BART Bicycle Access and Parking Plan.* http://www.bart.gov/docs/BART_Bicycle_Access_Parking_Plan.pdf

Bay Area Rapid Transit. 2003. *BART Station Access Guidelines.* http://www.bart.gov/docs/planning/access_guidelines.pdf

BC Transit. *Design Guidelines for Accessible Bus Stops.* http://www.transitbc.com/corporate/resources/pdf/res-urban-21.pdf

Canadian Urban Transit Association. 2007. *Arterial HOV Facilities in Canada.*

Canadian Urban Transit Association. 1993. *The Canadian Transit Handbook, 3rd ed.*

The Centre for Sustainable Transportation. 2005. *Child and Youth Friendly Land-use and Transport Planning Guidelines for Ontario.* http://cst.uwinnipeg.ca/documents/Guidelines_ON.pdf

Cervero, R. 2006. *Office development, rail transit and commuting choices. Journal of Public Transportation,* 9(5): 41-55.

Charlotte Department of Transportation. 2007. *Urban Street Design Guidelines.* http://charmeck.org/city/charlotte/Transportation/PlansProjects/Pages/Urban%20Street%20Design%20Guidelines.aspx

Christchurch City Council. 1999. *Bus Stop Location Policy.* http://www.ccc.govt.nz/thecouncil/policiesreportsstrategies/policies/groups/transport/busstoplocation.aspx

City of Bellingham. 2007. *Municipal Code – Large Retail Facility Design.*

City of Calgary. 2009. *Brentwood Station Area Redevelopment Plan.* http://www.calgary.ca/DocGallery/BU/planning/pdf/tod/brentwood/brentwood_sap.pdf

City of Calgary. 2004. *Transit Oriented Development Policy Guidelines.* http://www.calgarytransit.com/pdf/Approved%20TODPG%20041206.pdf

City of Edmonton. *LRT Carpool Parking.* http://www.edmonton.ca/transportation/ets/lrt-carpool-parking.aspx

City of Portland. 1998. *Pedestrian Design Guidelines.* http://www.portlandonline.com/transportation/index.cfm?c=34778&a=61759

City of Saint Paul. 2007. *Central Corridor Development Planning & Strategy.* http://www.stpaul.gov/index.aspx?NID=156

City of Thunder Bay. Active Transportation Thunder Bay. http://www.thunderbay.ca/Living/Getting_Around/Active_Transportation.htm

City of Toronto. *Design Guidelines for Greening Surface Parking Lots.* http://www.toronto.ca/planning/urbdesign/greening_parking_lots.htm

City of Toronto. *Parking and Loading Zoning Standards Review Phase One.* http://www.toronto.ca/zoning/pdf/ibi_phase1_report.pdf

City of Toronto. *Parking Standards Review: Examination of Potential Options and Impacts of Car Share Programs on Parking Standards.* http://www.toronto.ca/zoning/pdf/car_share_2009-04-02.pdf

City of Toronto. *Union Station Master Plan and Union Station District Plan.* http://www.toronto.ca/union_station/report.htm

Congress for New Urbanism. 2005. *Malls into Mainstreets.* http://www.cnu.org/sites/www.cnu.org/files/mallsintomainstreets.pdf

Cornell University. *Cornell Master Plan.* http://www.masterplan.cornell.edu/

Denver Union Station Public Authority. 2004. *Union Station Master Plan.* http://www.denverunionstation.org/index.php?option=com_content&view=article&id=60&Itemid=48

English Partnerships and the Housing Corporation. 2000. *Urban Design Compendium Volume 1.* http://www.urbandesigncompendium.co.uk/public/documents/UDC1FULL.pdf

Ewing, R. and Cervero, R. Summer 2010. *Travel and the Built Environment: A Meta-Analysis. Journal of the American Planning Association.* http://www.informaworld.com/smpp/content~db=jour~content=a922131982~frm=abslink

Ewing, R. 2000. *Pedestrian- and Transit-Friendly Design: A Primer for Smart Growth.* http://www.epa.gov/dced/pdf/ptfd_primer.pdf

Federation of Canadian Municipalities. 2005. *Strategies for Implementing Transit Priority.* http://gmf.fcm.ca/files/Infraguide/Transit/strategies_implementing_transit_priority.pdf

Grand Junction/Mesa County Metropolitan Planning Organization. 2003. *Transit Design Standards and Guidelines.* http://www.gjcity.org/citydeptwebpages/publicworksandutilities/transportationengineering/TEFilesThatLINKintoDWStoreHere/TEDS/TRANSITREGS.pdf

GO Transit. 2009. *Station Access Strategy.*

Initiative for Bicycle & Pedestrian Innovation. *Fundamentals of Bicycle Boulevard Planning & Design.* http://www.ibpi.usp.pdx.edu/media/BicycleBoulevardGuidebook.pdf

Institute of Transport Engineers. 2010. *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach.* http://www.ite.org/css/

King County Department of Transportation. *Park and Ride Electric Vehicle Charging Stations.* http://metro.kingcounty.gov/tops/parknride/parknride.html

Jacobs, J. 1961. *The Death and Life of Great American Cities.* New York: Random House and Vintage Books.

McCann and Rynne. 2010. *Complete Streets: Best Policy and Implementation Practices.* APA Planning Advisory Service

Metrolinx. 2008. *The Big Move.* http://www.metrolinx.com/en/regionalplanning/bigmove/big_move.aspx

Metrolinx. 2011. *Mobility Hub Guidelines.* http://www.metrolinx.com/en/projectsandprograms/mobilityhubs/mobility_hub_guidelines.aspx

Mid-Ohio Regional Planning Commission. 2005. *Breaking Barriers to Bicycling: Bicycle Lanes Best Practices and Pilot Treatments.* http://www.morpc.org/trans/BikePedBicycleFacilities-BestPractices.pdf

National Association of City Transportation Officials. *Urban Bikeway Design Guide.* http://nacto.org/cities-for-cycling/design-guide/

National Complete Streets Coalition. http://www.completestreets.org/

National Institute of Building Sciences. 2009. *Parking Facilities.* http://www.wbdg.org/design/parking.php

Appendix B References

New York City Department of Transportation. 2008. *World Class Streets: Remaking New York's Public Realm.* http://www.nyc.gov/html/dot/downloads/pdf/World_Class_Streets_Gehl_08.pdf

Ontario Growth Secretariat. *Urban Form Case Studies: Employment Lands.* https://www.placestogrow.ca/index.php?option=com_content&task=view&id=172&Itemid=26

Ontario Ministry of Transportation. 1985. *Geometric Design Standards for Ontario Highways (GDSOH) manual (most recent edition).* https://www.publications.serviceontario.ca/ecom/

Ontario Ministry of Transportation. 1996. *Ontario Bikeways Planning and Design Guidelines.*

Peel Region. *Walk and Roll Peel.* http://www.walkandrollpeel.ca/

Pucher, J. and and Buehler, R. 2009. *Integrating Bicycling and Public Transport in North America. Journal of Public Transportation 12(3).* http://www.nctr.usf.edu/jpt/pdf/JPT12-3Pucher.pdf

State of Rhode Island. *Warwick Intermodal Station.* http://www.dot.state.ri.us/engineering/intermod/index.asp

Transit Cooperative Research Program. 2003. *Bus Rapid Transit: Volume 2 – Implementation Guidelines.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_90v2.pdf

Transit Cooperative Research Program. 1996. *Guidelines for the Location and Design of Bus Stops.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_19-a.pdf

Transit Cooperative Research Program. 2004. *Traveler Response to System Changes.* http://www.trb.org/Publications/Blurbs/Traveler_Responses_to_Transportation_System_Change_162432.aspx

Transport Canada. *Multi-modal Bridges.* http://www.tc.gc.ca/media/documents/programs/cs50e_multimodalbridges.pdf

Transport Canada. 2004. *Transit Priority System: Planning and Pilot Project Deployment.* http://www.tc.gc.ca/eng/programs/environment-utsp-transitpriority-1078.htm

Transportation Association of Canada. Geometric Design Guide for Canadian Roads.

Transportation Research Board. 2009. *Transit-Friendly Streets: Design and Traffic Management Strategies to Support Livable Communities.* http://gulliver.trb.org/publications/tcrp/tcrp_rpt_33.pdf

United States Department of Transportation. 2005. *Transit Signal Priority: A Planning and Implementation Handbook.* http://www.fta.dot.gov/documents/TSPHandbook10-20-05.pdf

University of Utah. 2008. *The 2008 Campus Master Plan.*

Vélo Québec. 2010. *Planning and Design for Pedestrians and Cyclists.* http://www.velo.qc.ca/english/bikewaysdesign.php?page=handbook

Victoria Transport Policy Institute. *Parking Management - Strategies, Evaluation and Planning.* http://www.vtpi.org/park_man.pdf

Victoria Transport Policy Institute. *Parking Pricing Implementation Guidelines.* http://www.vtpi.org/parkpricing.pdf

Walk 21. http://www.walk21.com

Washington Metropolitan Transit Authority. 2008. *Station Site and Access Planning Manual.* http://www.wmata.com/pdfs/planning/Station%20Access/SSAPM.pdf

York Region. 2006. *Regional Transit-Oriented Development (TOD) Guidelines.* http://www.york.ca/departments/planning+and+development/long+range+planning/tod.htm

Chapter 3: Transit Improvement Guidelines

Burlington Transit. *Burlington Transit Youth Ambassador Program.* http://cms.burlington.ca/Page6048.aspx

Canadian Standards Association. 2004. *Accessible Design for the Built Environment.*

Canadian Transportation Agency. 2007. *Code of Practice: Passenger Terminal Accessibility.* http://www.otc-cta.gc.ca/aux_bin.php?auxid=120

Canadian Urban Transit Association. 2007. *Arterial HOV Facilities in Canada.*

Canadian Urban Transit Association. 2008. *Bringing Opportunities to Life: Accessible Transit in Canada.* http://www.cutaactu.ca/en/publicationsandresearch/resources/IssuePaperNo.28_BringingOpportunitiestoLife_AccessibleTransitinCanada.pdf

Canadian Urban Transit Association. 2007. *Bus Rapid Transit: A Canadian Perspective.* http://www.cutaactu.ca/en/publicationsandresearch/resources/IssuePaperNo.25_BusRapidTransit_ACanadianPerspective.pdf

Canadian Urban Transit Association. 1993. *The Canadian Transit Handbook, 3rd ed.*

Canadian Urban Transit Association. 2003. *Canadian Urban Transit Fact Book.*

Canadian Urban Transit Association. 2006. *Intelligent Transportation Systems: A Smart Future for Transit.* http://www.cutaactu.ca/en/publicationsandresearch/resources/IssuePaperNo.17_IntelligentTransportationSystems_ASmartFutureforTransit.pdf

Canadian Urban Transit Association. 2004. *Marketing Transit in Canada – Meeting the Ridership Challenge.* http://www.cutaactu.ca/en/publicationsandresearch/resources/IssuePaperNo.14_MarketingTransitinCanada_MeetingtheRidershipChallenge.pdf

Canadian Urban Transit Association. 2007. *A Profile of Canadian Transit Ridership.*

Canadian Urban Transit Association. 2007. *Public Transit and Small Communities.* http://www.cutaactu.ca/en/publicationsandresearch/resources/IssuePaperNo.11_PublicTransitandSmallCommunities.pdf

Canadian Urban Transit Association. 2007. *Rail Transit in Canada.* http://www.cutaactu.ca/en/publicationsandresearch/resources/IssuePaperNo.19_RailTransitinCanada.pdf

The Centre for Sustainable Transportation. 2009. *Child and Youth Friendly Land-use and Transport Planning Guidelines.* http://www.kidsonthemove.ca/Provinces/Ontario.htm

City of Edmonton. *Partnership with Loyalty Program.* http://www.edmonton.ca/transportation/ets/fares/ride-with-air-miles.aspx

City of Mississauga. *MiWay.* http://www.mississauga.ca/portal/miway

City of North Bay. *Dial-a-Cab Service.* http://cityofnorthbay.com/cityhall/department/transit/schedules.asp

Crime Prevention through Environmental Design. www.cptedontario.ca/

Florida Department of Transportation. 2009. *Best Practices in Transit Service Planning.* http://www.nctr.usf.edu/pdf/77720.pdf

Fraser Basin Council. 2009. *TDM Toolkit.* http://www.fraserbasin.bc.ca/programs/tdm_toolkit.html

GO Transit. *Accessibility.* http://www.gotransit.com/public/en/travelling/accessibility.aspx

GO Transit, *Toronto-Niagara Greenbelt Express.* http://www.biketrain.ca/toronto-niagara-greenbelt-express

London Transit. *WebWatch.* http://www.ltconline.ca/webwatch/

Metrolinx. 2008. *Green Paper #2.* http://www.metrolinx.com/docs/general/RTPGreenPaper2.pdf

New Zealand Asset Management Support. *International Infrastructure Management Manual.*

OC Transpo. *Seniors Ride Free on Wednesdays.* http://www.octranspo1.com/community-events/senior_riders

Ontario. *Regulation 629: Vehicles for the Transportation of Physically Disabled Passengers, Highway Traffic Act.* http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900629_e.htm

Ontario Ministry of Community and Social Services. *Accessibility Standard for Transportation.* http://www.mcss.gov.on.ca/en/mcss/programs/accessibility/other_standards/transportation/index.aspx

Ontario Ministry of Community and Social Services. *Access ON.* http://www.mcss.gov.on.ca/en/mcss/programs/accessibility/index.aspx

Ontario Ministry of Finance. *Ontario Demographics.* http://www.fin.gov.on.ca/en/economy/demographics/

Ontario Ministry of Transportation. 2005. *A Guide to Preparing a Ridership Growth Plan.*

Ontario Ministry of Transportation. 1996. *Ontario Bikeways Planning and Design Guidelines.*

Ontario Ministry of Transportation. *TDM Grant Program.* http://www.mto.gov.on.ca/english/sustainability/programs/tdm-grant.shtml

Ontario Ministry of Transportation. 2006. *A Guide to Preparing a Transit Asset Management Plan.*

Ontario Trillium Foundation. *Your Community in Profile.* http://www.trilliumfoundation.org/cms/en/html/knowledge_sharing/comm_profiles.aspx?menuid=312

Peel Region. *Transhelp.* http://www.peelregion.ca/transhlp/

Portland Bureau of Transportation. *Portland Bicycle Plan for 2030.* http://www.portlandonline.com/transportation/index.cfm?c=44597&a=289122

Public Art Online. *Art in Transit.* http://www.publicartonline.org.uk/resources/reports/repregeneration/artintransit.php

Public Health Agency of Canada. *Age-friendly Rural and Remote Communities: A Guide.* http://www.phac-aspc.gc.ca/seniors-aines/publications/public/healthy-sante/age_friendly_rural/index-eng.php

Ravinia. *Chicago Metra Ravinia Service.* http://www.ravinia.org/MetraRail.aspx

Smart Commute. *Carpool Zone.* https://www.carpoolzone.smartcommute.ca/en/my/index.php

Smart Commute. *Employer Success Stories.* http://www.smartcommute.ca/en/success-stories/employers

Société de transport de Montréal. http://www.stm.info/

The State University of New York. 2001. *Universal Design New York.* http://www.ap.buffalo.edu/idea/udny/

Statistics Canada. 2006. *Census Trends, 2006 Census.* http://www12.statcan.ca/census-recensement/2006/dp-pd/92-596/index.cfm?Lang=eng

Statistics Canada. 2006. *2006 Community Profiles.* http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E

Statistics Canada. 2004. *Public Transit Use Among Immigrants.* http://www.statcan.gc.ca/pub/11f0019m/11f0019m2004224-eng.pdf

Toronto Transit Commission. *TTC Accessibility.* http://www3.ttc.ca/TTC_Accessibility/index.jsp

Transit Cooperative Research Program. 2007. *Elements Needed to Create High Ridership Transit Systems.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_111.pdf

Transit Cooperative Research Program. 2010. *A Guidebook for Developing a Transit Performance Measurement System.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_report_88/Guidebook.pdf

Transit Cooperative Research Program. 2010. *A Guide for Planning and Operating Flexible Public Transportation Services.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_140.pdf

Transit Cooperative Research Program. 2001. *Communicating with Persons in a Multimodal Transit Environment.* http://onlinepubs.trb.org/onlinepubs/tcrp/tsyn37.pdf

Transit Cooperative Research Program. 2010. *Guidebook for Rural Demand-Response Transportation: Measuring, Assessing, and Improving Performance.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_136.pdf

Transit Cooperative Research Program. 1997. *Improving Transit Security.* http://onlinepubs.trb.org/onlinepubs/tcrp/tsyn21.pdf

Transit Cooperative Research Program. 2008. *Leveraging ITS Data for Transit Market Research.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_126.pdf

Transit Cooperative Research Program. 2008. *Synthesis on Automatic Vehicle Location (AVL) systems.* http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_syn_73.pdf

Transit Cooperative Research Program. 2007. *Toolkit for Integrating Non-Dedicated Vehicles in Paratransit Service.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_121.pdf

Transit Cooperative Research Program. 1998. *Transit Scheduling: Basic and Advanced Manuals.* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_30-a.pdf

Transit Cooperative Research Program. 2004. *Traveler Response to System Changes.* http://www.trb.org/Publications/Blurbs/Traveler_Responses_to_Transportation_System_Change_162432.aspx

Transport Canada. 2002. *Commuter Options: The Complete Guide for Canadian Employers.*

Transport Canada. *ecoMobility.* http://www.tc.gc.ca/eng/programs/environment-ecomobility-menu-eng-1934.htm

Transport Direct. *Route Planner.* http://www.transportdirect.info/Web2/Home.aspx?cacheparam=5

Transport for London. *Journey Planner.* http://journeyplanner.tfl.gov.uk/user/XSLT_TRIP_REQUEST2?language=en

Transportation Association of Canada. 2008. *Best Practices for the Technical Delivery of Long-Term Planning Studies in Canada, Final Report.* http://www.tac-atc.ca/english/resourcecentre/readingroom/pdf/best-practice.pdf

Transportation Research Board. 2010. *Bicycling and Transit: A Marriage Unrealized.*

United States Department of Transportation. *Core Technology Fact Sheet.*

United States Federal Transit Administration. 2005. *Transit Security Design Considerations.* http://transit-safety.volpe.dot.gov/security/securityinitiatives/designconsiderations/default.asp

The Victoria Transport Policy Institute. *TDM Encyclopedia.* http://www.vtpi.org/tdm/

Web Accessibility Initiative. *World Wide Web Consortium's Web Content Accessibility Guidelines 2.0.* http://www.w3.org/WAI/

World Health Organization. 2007. *Checklist of Essential Features of Age-Friendly Cities.* http://www.who.int/ageing/publications/Age_friendly_cities_checklist.pdf

World Health Organization. 2007. *Global Age-Friendly Cities: A Guide.* http://www.who.int/ageing/publications/Global_age_friendly_cities_Guide_English.pdf

York Region. *Five-Year Service Plan.* http://www.yorkregiontransit.com/whats-ahead/ExecSummary_Final.pdf

Chapter 4: Implementation

City of Hamilton. *Transit-Oriented Guidelines for Hamilton.* http://www.hamilton.ca/NR/rdonlyres/9D772317-177E-4696-88CF-B63E56B6D2E6/0/TODGuidelines_Volume2_WEB.pdf

Commonwealth of Massachusetts. *Smart Growth/Smart Energy Toolkit - Transit-Oriented Development Overlay District.* http://www.mass.gov/envir/smart_growth_toolkit/pages/CS-tod-somerville.html

Ontario Ministry of Environment. *Codes of Practice.* http://www.ene.gov.on.ca/en/publications/forms/index.php#EnvironmentalAssessment

Ontario Ministry of Environment. *Ontario Class Environmental Assessments.* http://www.ene.gov.on.ca/en/eaab/class-environmental-assessments.php

Ontario Ministry of Environment. *Ontario's Transit Project Assessment Process.* http://www.ene.gov.on.ca/envision/env_reg/er/documents/2009/010-3784.pdf

Ontario Ministry of Municipal Affairs and Housing. *Brownfields Ontario.* http://www.mah.gov.on.ca/Page220.aspx

Ontario Ministry of Municipal Affairs and Housing. *Community Improvement Planning Handbook.* http://www.mah.gov.on.ca/Page1297.aspx

Ontario Ministry of Municipal Affairs and Housing. *Height and Density Bonusing* (s.37). http://www.mah.gov.on.ca/Page6845.aspx

Ontario Ministry of Municipal Affairs and Housing. *Ontario Development Permit System.* http://www.mah.gov.on.ca/Page4755.aspx

Public Health Agency of Canada. *Bringing Health to the Planning Table: A Profile of Promising Practices in Canada and Abroad.* http://www.phac-aspc.gc.ca/publicat/2009/be-eb/pdf/be-eb-eng.pdf

Reconnecting America: Center for TOD. http://reconnectingamerica.org/public/tod

Transport Canada. *Marketing Active Transportation.* http://www.tc.gc.ca/eng/programs/environment-utsp-casestudyactivetransportation-1069.htm

US Department of Transportation. *Livability in Transportation Guidebook.* http://www.wsdot.wa.gov/NR/rdonlyres/035FF785-7D8E-4DB0-8D9B-08C0ED2AD936/0/Livability_in_Transportation_Guide.pdf

York Region. 2006. *Regional Transit-Oriented Development (TOD) Guidelines.* http://www.york.ca/departments/planning+and+development/long+range+planning/tod.htm

Appendix A: Case Studies

Capital Area Regional Transportation Coordination Plan for the Capital Area. http://www.capitalareartcc.org/rtcc_plan.pdf

Capital Area Rural Transportation System. http://www.ridecarts.com/

City of Calgary. Brentwood Station Area Plan. http://www.calgary.ca/DocGallery/BU/planning/pdf/tod/brentwood/brentwood_sap.pdf

City of Charlotte. *Urban Street Design Guidelines*. http://www.charmeck.org/Departments/Transportation/Urban+Street+Design+Guidelines.htm

City of Ottawa. *Ottawa Official Plan*. http://www.ottawa.ca/city_hall/ottawa2020/official_plan/index_en.html

City of Ottawa. *Ottawa Transit Map*. http://www.ottawa.ca/residents/planning/op/scheduled_en.pdf

City of Ottawa. *Transit-Oriented Development Guidelines*. http://www.ottawa.ca/residents/planning/design_plan_guidelines/completed/transit/index_en.html

City of Saint Paul. 2007. *Central Corridor Development Planning & Strategy*. http://www.stpaul.gov/index.aspx?NID=156

City of Saint Paul. *LRT Station Area Plans*. http://www.stpaul.gov/index.aspx?NID=159

City of Toronto. *Toronto Bicycle Station*. http://www.toronto.ca/cycling/bicycle-station/index.htm

Complete Streets. http://www.completestreets.org

CUTA. *SmartDRIVER for Transit*. http://www.cutaactu.ca/en/educationandtraining/smartDRIVER.asp

GO Boulder. http://www.bouldercolorado.gov/index.php?option=com_content&view=article&id=10239&Itemid=3365

Grand River Transit. http://www.grt.ca

Lane Transit District. *EmX*. http://www.ltd.org/search/showresult.html?versionthread=d38519362672c662c61a9300c1dd78be

North Bay Transit. http://www.city.north-bay.on.ca/cityhall/department/transit/profile.asp

North Bay Transit. *Go Green on the Bus*. http://ggob.me/

Oakville Transit. *Oakville Transit Routes*. http://www.oakvilletransit.com/routes.htm

San Francisco Municipal Transportation Authority. http://sfgov.org/site/frame.asp?u=http://www.sfmta.com/

Transport Canada. *Bicycle End-of-Trip Facilities: A guide for Canadian municipalities and employers*. http://www.tc.gc.ca/eng/programs/environment-urban-menu-eng-1887.htm

Transport Canada. *Bicycle Station Case Study*. http://www.tc.gc.ca/eng/programs/environment-urban-menu-eng-1895.htm#6.1

Transport Canada. *EasyGO Traveller Information System*. http://www.tc.gc.ca/eng/programs/environment-utsp-casestudy-cs68e-easygo-271.htm

Winnipeg Transit. *Improvements Program*. http://myride.winnipegtransit.com/assets/287/Transit_Improvements_highres.pdf

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Appendix C

Glossary and Index

This section contains a glossary and index of key terms and concepts.

Glossary

Active transportation: Non-motorized travel, including walking, cycling, roller-blading and movements with mobility devices. The active transportation network includes sidewalks, crosswalks, designated road lanes and off-road trails to accommodate active transportation.

Active uses: Land uses such as retail, storefronts, cafes and restaurants, which keep the area active with pedestrian activity at street level and maintain visual interest.

Alternative Energy Vehicles: Vehicles that operate on a fuel other than the traditional petroleum fuels, such as biofuel, or are powered by something other than petroleum, such as electricity.

Automatic Passenger Counter (APC): A data collection tool located in a facility such as a station or on a transit vehicle that automatically counts passenger boardings and alightings. The data obtained can be used for both service monitoring or service planning purposes and include both time and location information. APC technologies include horizontal or vertical infrared beams, treadle mats, or machine vision applications.

Automatic Vehicle Location (AVL): A computer-based vehicle tracking system that uses a location technology such as a Global Positioning System. The location data collected is transmitted via a traditional radio frequency or a cellular-based communications system from the vehicle or data point to a dispatch centre to enable the public transportation agency to monitor the real-time position of its vehicles.

Big-Box Retail: Retail outlets that use a large amount of floor space, typically 50,000 sq ft or larger, often in a single story.

Bike Boxes: Pavement markings typically found on streets with bike lanes which allow cyclists to stop at a traffic light in a delineated area between the street to be crossed and the motor vehicles. See photograph on page 53.

Bike Share: Bicycles provided for use by individuals, for free or for a nominal fee, typically on a short-term basis to identified users of the bike sharing system.

Brownfield Sites: Undeveloped or previously developed properties that may be contaminated. They are usually, but not exclusively, former industrial or commercial properties that may be underutilized, derelict or vacant.

Built-up Areas: Areas that have already been developed within the established settlement area, but may not be designated as higher-density nodes or corridors. In many instances these areas are comprising lower-density residential and/or employment uses (Guideline 1.1.4). Within the Greater Golden Horseshoe these may include areas defined as built-up area in the Growth Plan for the Greater Golden Horseshoe, 2006.

Bus-Bulb: An extension of the sidewalk into the roadway, allowing a bus to stay in its traffic lane to drop off and pick up passengers instead of pulling over to the curb. See photograph on page 57. Benefits include saved time from buses not having to pull back into traffic, reduced sidewalk congestion, less swerving from lane to lane, more space for bus shelters and amenities, and easier full-length alignment of a bus entrance with a raised curb stop to allow level boarding. Bus bulbs also retain more parking when compared to a bus stop located in a parking lane, where cars can park immediately on either side of the bus stop itself. Drawbacks include delaying vehicles that must wait behind the bus, especially on streets that provide only one traffic lane in each direction. Care should also be taken when designing bus bulbs to ensure that they do not create dangerous conditions for cyclists.

Bus Rapid Transit (BRT): Buses on grade-separated roadways or dedicated lanes to transport passengers without interference from other traffic. Such systems usually include dedicated bus lanes, signal priority at intersections, off-bus fare collection to speed up boarding, level boarding (low-floor buses or high-level platforms) to enhance accessibility and enclosed stations.

Car Share: A short-term, membership-based automobile rental service that allows users to join and gain access to the use of vehicles. Vehicles are parked and accessible in a number of public or private parking lots throughout a community including at or near transit stations. This allows individuals to reduce their cost of living by providing access to a vehicle only when required.

Centre-to-Centre Buses: See vanpool.

Community Transportation: The coordination of community transportation services amongst agencies and organizations that provide transportation to its members and clients with the aim of sharing resources and improving community access to services.

Complete Streets: Streets planned to balance the needs of all road users, including pedestrians, cyclists, transit and motorists.

Computer Aided Dispatch (CAD): A software program for transit agencies that incorporates transit routes, schedules, trip orders, and vehicle assignments to notify dispatchers of the location of transit vehicles. The software enables dispatchers to more efficiently dispatch trip requests or respond to disruptions in the system, such as breakdowns.

Contraflow Lane: Allows only bicycles or priority vehicles (such as a public bus) to travel in the opposite direction along a one-way street. Note that this term can also apply to bi-directional lanes reserved for peak-hour, peak-direction travel.

Corridors: Refers to a linear route that provides for the movement of people and goods using a variety of transportation modes, including walking, cycling, transit and private vehicles. Corridors designated for transit-supportive intensification are typically associated with more intense density, activity and mix of uses, located along major transit routes (Guideline 1.1.3). Within the Greater Golden Horseshoe these may include areas defined as intensification corridors in the Growth Plan for the Greater Golden Horseshoe, 2006.

Curb Radius/Radii: The size and curve of an intersection corner. A wide curb radius typically results in high-speed turning by motorists. Reducing the turning radius reduces turning speeds, shortens the crossing distance for pedestrians and improves sight distance between pedestrians and motorists. Nearby land uses and types of road users should be considered when designing an intersection so that curb radii are sized appropriately. Where there is a parking and/or bike lane, curb radii can be tighter, because vehicles will have more room to make the turn. See picture on page 49.

Density Bonusing: An incentive-based tool that allows developers to increase the maximum allowable development on a property in exchange for community facilities, services or other measures that help achieve public policy goals. See Chapter 4: Innovative Planning Approaches for more details.

Designated Growth Areas: Lands within settlement areas designated in an official plan for growth over the long-term planning horizon, but which have not yet been fully developed. Designated growth areas include lands which are designated and available for residential growth, as well as lands required for employment and other uses. Within the Greater Golden Horseshoe these may include areas defined as designated greenfield area in the Growth Plan for the Greater Golden Horseshoe, 2006.

District: An intermediate scale of planning area, smaller than a local municipality, but comprising a number of neighbourhoods within a municipality. Detailed land use planning policies at the district level are usually addressed in secondary plans.

Electronic Fare Payment (EFP): An automated fare collection and processing system that enable customers to use a variety of media such as magnetic stripe cards, smart cards or credit cards to pay for transit trips. The cashless system speeds boarding times and simplifies fare collection for transit agencies.

Fare Integration Program: When partnerships are made between different transit authorities in a region, a fare integration program may be implemented. This enables passengers to pay for and use different forms of transportation within an integrated, seamless and convenient system. Fare integration approaches can take the form of regional passes, a common regional fare structure, and acceptance of major operators' media (tokens, passes) by other operators.

Feeder Bus Routes: A bus service that picks up and delivers passengers to a higher-order transit station such as a rail transit station, rapid transit line, express-bus stop or terminal.

Geographic Information System (GIS): A system of hardware and software used for storage, retrieval, mapping, and analysis of geographic data. Spatial features are stored in a coordinate system (latitude/longitude, state plane, Universal Transverse Mercator (UTM), etc.), which references a particular place on the earth. Descriptive attributes in tabular form are linked with spatial features. Geographic data and any associated attributes in the same coordinate system can then be layered together for mapping and analysis.

Greyfields: Previously developed properties that are not contaminated. They are usually, but not exclusively, former commercial properties that may be underutilized, derelict or vacant.

Grid Network: The grid plan, grid street plan or gridiron plan is a type of city plan in which streets run at right angles to each other, forming a grid. These patterns display a higher degree of connectivity than hierarchical road patterns that feature dead-end streets and fewer through connections.

High Occupancy Vehicle (HOV) Lanes: Special lanes typically reserved for vehicles carrying at least two people as well as transit vehicles. They are often denoted by signs and a recognizable symbol (a diamond symbol is used on Ontario highways) painted on the pavement. Ontario's provincial HOV lanes are located in the median lane and are separated from the general traffic lanes by a painted buffer. Vehicles carrying at least two people may enter and exit the HOV lane only at clearly designated points. On municipal roads, HOV lanes are generally located in the curb lanes. HOV lanes can be designated on a full-time basis, or may be limited to peak travel periods of the day. Bicycles may also be permitted on municipal HOV lanes in some instances.

Higher Order Transit: Transit that generally operates in its own dedicated right-of-way, outside of mixed traffic, and therefore can achieve a frequency of service greater than mixed-traffic transit. Higher order transit can include heavy rail (such as subways), light rail (such as streetcars), and buses in dedicated rights-of-way.

Infill: New development within existing communities on previously underutilized sites, typically at a higher density.

Infrastructure: Physical structures (facilities and corridors) that form the foundation for development. Infrastructure includes: sewage and water systems, sewage treatment systems, waste management systems, electric power generation and transmission, communications/telecommunications, transit and transportation corridors and facilities, oil and gas pipelines and associated facilities.

Intelligent Transportation Systems (ITS): The use of real-time computer/communications/information technology for advanced, traffic-responsive, area-wide traffic control and to provide information which allows transportation providers to optimize transportation system operations and enable travellers to use the system more efficiently and effectively, while also increasing their convenience and ease of travelling.

Intensification: The development of a property, site or area at a higher density than currently exists through:
a) redevelopment, including the reuse of brownfield sites;
b) the development of vacant and/or underutilized lots within previously developed areas;
c) infill development; and
d) the expansion or conversion of existing buildings.

Intermodal Transit Hub: Stations or centres where different transit modes come together and allow for easy transfers from one mode to another. They can also facilitate transfers at different scales: local, regional and intercity.

Land Management Strategy: Identifies parcels of land and sets out a plan for their future development, including strategies for disposition, phasing of development and general development characteristics.

Lay-by Lane: A designated paved area beside a road that enables vehicles to stop temporarily to drop-off or pick-up passengers without disrupting traffic.

Leap-frog Development: When new development is built some distance away from an existing urban area, bypassing vacant parcels located closer to the city. Because land prices are lower in those areas, the cost of housing in these developments is also lower. However, because leapfrog development bypasses areas already served by public facilities, it results in higher infrastructure costs to service more distant parcels of land.

Legibility: The ease with which it is possible to read and understand something. In the context of wayfinding and station design, the ease with which individuals can understand their environment, where they are and how to get where they want to go.

Light Rail Transit (LRT): Electric rail cars in grade-separated rights-of-way. They have lower capacity and speed than heavy rail and metro systems, but higher capacity and speed than traditional street-running tram systems. While LRT rails are usually separated from other traffic, they may also run in mixed traffic. LRT vehicles are usually given signal priority at intersections.

Line-Haul Service: A cross-town transit route. Typically, travel time for a line-haul service is no more than 15-20 minutes end to end.

Main Street: Contains a range of street-oriented uses including retail, cultural, institutional, residential, personal services and employment. Each main street has characteristics unique to the neighbourhood in which it belongs. It is important to consider historical preservation to maintain those characteristics.

Major Transit Stations: Focal points within a community's transit network which act as important reception areas for transit riders and places of transfer between various modes and systems. Within the Greater Golden Horseshoe these may include stations and surrounding areas defined as major transit station areas or mobility hubs in the Growth Plan for the Greater Golden Horseshoe, 2006, and The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area, 2008.

Mid-block Connection or Mid-block Walkway: Links within and across blocks that provide connections for pedestrians and cyclists. They are particularly useful where there are large blocks that may take a long time to travel around.

Minimum Density Threshold: A zoning tool that specifies the minimum allowable development density or floor area ratio. The intent of minimum density thresholds is to encourage higher densities and more compact forms of development.

Mixed-Use Development: Areas characterized by a wide variety of shopping, employment, entertainment, light industrial and residential uses. Mixed-use development may occur at the level of individual buildings or complexes, or at a larger scale within activity nodes or corridors.

Mobility Aid Securement System: A system used to secure a mobility aid, such as a wheelchair, into place to prevent undesired movement when driving or being transported in a vehicle.

Mobility Hubs: Major transit station areas within the Greater Golden Horseshoe identified by Metrolinx as places of connectivity between regional rapid transit services, local transit services and possibly inter-city transportation services, which have or are planned to have an intensive concentration of mixed uses, such as employment, residences, retail, services or entertainment around a major transit station. Mobility hubs are located at the interchange of two or more current or planned regional rapid transit lines as identified in the Metrolinx Regional Transportation Plan. These areas are generally forecasted to achieve or have the potential to achieve a minimum density of approximately 10,000 people and jobs within an 800 m radius. See also Major Transit Stations in this glossary.

Modal Split: The proportion of total person trips using each of the various different modes of transportation. The proportion using any one mode is its modal split.

Multi-Use Trails: Dedicated pathways for mixed active transportation, such as cycling, walking and in-line skating. Trail networks ideally link key areas of the community and connect neighbourhoods, town centres, parks and schools.

Natural Surveillance: Used in Crime Prevention Through Environmental Design (CPTED) models for crime prevention. Natural surveillance can be facilitated by designing the placement of physical features, activities and people in such a way as to maximize visibility and foster positive social interaction. Natural surveillance increases the perception that people can be seen, which limits the opportunity for crime. Other ways to promote natural surveillance include low landscaping and installation of street lights.

Nodes: Areas within settlement areas of more intense density, mixed-use and activity. They are compact clusters of uses that may include downtowns, mixed-use communities, clusters of office buildings, post-secondary educational campuses or other higher-density areas both large and small (Guideline 1.1.2). Within the Greater Golden Horseshoe these may include areas defined as urban growth centres, major transit station areas, anchor hubs or gateway hubs in the Growth Plan for the Greater Golden Horseshoe, 2006, and The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area, 2008.

Open Spaces/Open Space Network: Open spaces are parks, plazas, green spaces, natural areas, or bicycle/walking trails; when linked together they are open space networks.

Park and Ride: Park and rides are car parking lots that offer transit users a place to park their car, then transfer to a public transit service to complete their journey. They are typically used in suburban locations where distances to transit service are longer. Park and ride facilities should be visible from and located along heavily used commuter routes.

Parking Improvement Districts: A way to funnel parking meter funds back into the community through streetscape improvements, increased security measures, and improvements that promote walking and public transportation use.

Pedestrian: Refers to all people on foot or moving at walking speed, including those who use mobility aids (wheelchairs, scooters etc.), those with strollers and buggies, and people with limited mobility.

Pedestrian District: Characterized by high levels of pedestrian activity, where pedestrians are prioritized over other forms of movement. Some municipalities designate pedestrian districts through zoning, restricting or eliminating vehicular travel in the area. It can be a neighbourhood, node or corridor within a community and typically contains a high mix of uses which contribute to the higher levels of pedestrian activity.

Pedestrian-Oriented Lighting: Street lights installed at a lower height than arterial street lighting to improve walkway illumination for pedestrian traffic and enhance community safety. Typically, this lighting is positioned over the sidewalk, rather than the street, at about 4 to 6 m above the ground.

Pedestrian Pathway: Paved walkways that are lit and accessible for users of different abilities. Pedestrian pathways can also be underground, creating indoor connections between buildings and destinations.

Pedestrian Plaza: A type of public space that can act as an important organizing element in a dense urban environment. Within a station area, pedestrian plazas can facilitate transfers between modes, act as a receiving point for pedestrians and contain a range of services and amenities for transit users.

Pedestrian Through Zone: A section of sidewalk reserved for pedestrians. Sidewalks comprise four zones: curb, furnishings, pedestrian, and frontage. The curb zone abuts the street and provides a buffer between the sidewalk and the street. The furnishings zone lies between the curb zone and pedestrian through zone, and provides a location for benches, bus shelters and other amenities such as trash receptacles, bicycle racks, and lighting. The pedestrian through zone is the sidewalk space kept clear for walking and is located between the furnishings zone and the frontage zone. The pedestrian through zone should be clear of obstructions at all times. Finally, the frontage zone provides a transition between the building or property line and the pedestrian through zone. It may feature furniture and act as a patio.

Permeability: The degree to which pedestrians can see inside or physically enter buildings or sites. A permeable façade or site helps create a more animated and safe environment.

Place-making: Building on a local community's assets to create spaces that attract people to the area and make a place memorable and enjoyable, for example, the addition of parks, plazas or public space features which encourage members of the community to meet, relax, play and engage with each other.

Proof-of-Payment System: Drivers are not responsible for collecting and inspecting every fare with this system. Instead, fare inspectors randomly check passenger transit tickets, passes and transfer stubs, and issue fines to those who do not present them. Proof-of-payment systems speed up boarding and reduce dwell times, as passengers can enter through any door of the vehicle, provided they have valid proof of fare payment. However, fare evasion under such a system can be an issue if not enforced.

Public/Civic Infrastructure: Large scale infrastructure such as highway interchanges, bridges, and utility easements.

Public Realm: All spaces to which the public has unrestricted access, such as streets, parks and sidewalks.

Queue Jump Lanes: Short roadway lanes provided on the approaches to signalized intersections which allow buses or cyclists to by-pass queued traffic and enter the intersection before other traffic when the traffic light turns green.

Redevelopment: The creation of new units, uses or lots on previously developed land in existing communities, including brownfield sites.

Region/Regional Municipality: An upper tier municipality, comprising a number of local or area municipalities, which carries out regional-scale planning functions. Counties or district municipalities which undertake planning functions are also included in this definition.

Reserved Bus Lanes: Traffic lanes designated for bus use only, that are marked and signed differently from adjacent lanes but are not physically separated from them.

Residential/Employment Balance: Refers to the distribution of employment relative to the distribution of workers within a given geographic area.

Real-Time Trip Planning Information: Reflects travel conditions as they actually occur. To achieve this, vehicle location and expected travel times must be updated every few minutes or seconds.

Reverse Lotting: Lots located adjacent to an arterial or collector road which front onto an internal street, while the rear yard faces onto the arterial or collector road. Landscaping and privacy fences are usually located adjacent to the arterial or collector road, and access onto the arterial or collector is strictly limited.

Right-of-Way: Land that is reserved, usually through legal designation, for transportation and/or utility purposes, such as for a trail, hydro corridor, rail line, street or highway. A right-of-way is often reserved for the maintenance or expansion of existing services. A permit or legal permission is generally required for any work or encroachment on a right-of-way.

Roads, Arterial and Collector: Major traffic, pedestrian, cycling and transit routes, intended to carry larger volumes of vehicular traffic, providing continuous access across neighbourhoods.

Roads, Local: Roads designed to carry low traffic volumes, at low speeds, which are intended primarily to provide access to abutting uses, rather than to provide through traffic routes.

Screening: Landscaping can be used as a strategy to "screen" or mask parking lots or other visually unappealing elements of the urban landscape. Care should be taken to ensure that screening does not affect pedestrian safety.

Secondary Plan: A land use policy plan for a district or large neighbourhood within a municipality which provides more detailed land use policies and designations than those found in a municipal official plan.

Segregated Cycling Facilities: Segregated cycling facilities are lanes, tracks or paths designated for use by cyclists and from which motorised traffic is excluded by means of physical barriers (e.g. bollards or curbs/medians).

Self contained communities: These communities have a mix of uses that allow people to live, work, shop, and recreate without having to travel beyond the community. They also have a range of housing types, employment, retail, open spaces, and community facilities.

Semi-Public Areas: Extend from the edge of a building to the public sidewalk. These areas are outside the public right-of-way and form part of the building's property, but are accessible to the public. Gardens, fountains, seating areas, and kiosks with small outdoor dining areas are all types of semi-public amenities to consider for this zone, with the understanding that these may be closed or cordoned off during certain hours.

Settlement areas: Urban areas and rural settlement areas within municipalities that are:

a) built-up areas where development is concentrated and which have a mix of land uses; and
b) lands which have been designated in an official plan for development over the long term planning horizon.

Signal Priority: A traffic signal control scheme which triggers a traffic signal to turn green in the direction that a transit vehicle is travelling, as the vehicle approaches the intersection. Since transit vehicles hold many people, giving priority to transit can potentially increase the number of people that can move through an intersection. There are different types of signal priority:

- *Passive* priority strategies use timed coordinated signals in the area-wide traffic signal timing scheme.
- *Active* priority strategies involve detecting the presence of a transit vehicle and giving the transit vehicle priority. Each transit vehicle has an on-board transmitter that prompts the signal to give an early green signal or hold a green signal that is already active. (Also see Transit Signal Priority in this glossary)
- *Real-time* control strategies can consider not only the presence of a transit vehicle but also the adherence to schedule and the volume of traffic. One common strategy is to give priority only to late buses. This strategy optimizes schedule adherence rather than running time.

Smart Card: Plastic cards, usually the size of a credit card, with an embedded microchip that can be loaded with data. These are used in Electronic Fare Payment (EFP) systems.

Specialized Transit: A door-to-door service for passengers with special needs. Specialized transit riders must meet specified eligibility criteria and are required to book their trips in advance.

Spill-out Space: The area between the building or property line and the pedestrian through zone. Spill-out spaces often allow restaurants and cafes to provide outdoor seating for their customers. Spill-out spaces help animate the public realm, creating a more inviting environment for pedestrians.

Street Intersection Density: This is a measure of walkable communities, and is determined by calculating the number of intersections in a given area. Typically, the more intersections per area, the greater the degree of connectivity and route options available.

Streetscape: The elements of a street, including the road, buildings, street furniture, trees and open spaces, that define its character. Streetscapes can be divided into different types, depending on type/intensity of land use, primary user groups and built form character. Streetscaping is the application of various elements found within the streetscape to support the unique character and function of an area.

Structured Parking: An above- or below-grade structure designed to accommodate vehicle parking.

Transit: Transit refers primarily to the public transit systems, including specialized transit, operated by or on behalf of municipal, regional or provincial governments, or transit authorities and includes all transit modes such as buses, streetcars, light rail and commuter rail lines. In this document, the term transit may also include transportation vehicles such as vans, ferries or taxis used to supplement transit service.

Transit-Oriented Development: A planning approach that calls for high-density, mixed-use business/residential neighbourhood centers to be clustered around transit stations and corridors. Transit-oriented development is focused within an 800 m radius of transit stops, with the highest intensity and mix of land uses concentrated within 400 m or adjacent to the station. A transit-supportive approach to land-use planning, urban design and transit operations may include transit-oriented development as well as a variety of other strategies that make transit viable and improve the quality of the experience of using transit. These may be implemented near transit stops or stations or at a broader scale, as appropriate. See transit-supportive.

Transit Signal Priority (TSP): Gives transit vehicles priority at traffic signals by adjusting signal duration to minimize the transit vehicle delay. Signal priority may be manually activated by the driver with a switch, or automatically through the use of an Automatic Vehicle Location system. Also see signal priority.

Transit-Supportive: Makes transit viable and improves the quality of the experience of using transit. When used in reference to development, it often refers to compact, mixed-use development that has a high level of employment and residential densities to support frequent transit service. When used in reference to urban design, it often refers to design principles that make development more accessible for transit users, such as roads laid out in a grid network rather than a discontinuous network; pedestrian-friendly built environment along roads to encourage walking to transit; reduced setbacks and placing parking at the sides/rear of buildings; and improved access between arterial roads and interior blocks in residential areas.

Transportation Demand Management (TDM): A set of strategies that results in more efficient use of the transportation system by influencing travel behaviour by mode, time of day, frequency, trip length, regulation, route, or cost. Examples include: carpooling, vanpooling, and shuttle buses; parking management; site design and on-site facilities that support transit and walking; bicycle facilities and programs; pricing (road tolls or transit discounts); flexible working hours; telecommuting; high occupancy vehicle lanes; park-and-ride; incentives for ride-sharing, using transit, walking and cycling; initiatives to discourage drive-alone trips by residents, employees, visitors, and students.

Urban Boundaries: An urban growth boundary circumscribes an entire urbanized area and is used by governments as a guide to zoning and land use decisions. In a rural context, the terms town boundary, village curtilage or village envelope may be used to apply the same principles.

Vanpool/Centre-to-Centre Bus: A form of public transportation which acts as a cross between a private taxi and a public bus. Vanpools or centre-to-centre buses follow a fixed route but have a flexible schedule, and the driver can make detours to reach specific locations.

Window Streets: Window streets are a system of service roads or looped local roads located parallel to limited access arterial roads. The intent of a window street is to enable uses such as housing to face onto limited access arterial roads without having to provide access from the arterial. This helps prevent a situation where built form backs out onto these high volume streets, improves connectivity and provides more eyes on the street, but results in the duplication of road infrastructure, wide streets and is less ideal than buildings fronting directly onto an arterial.

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